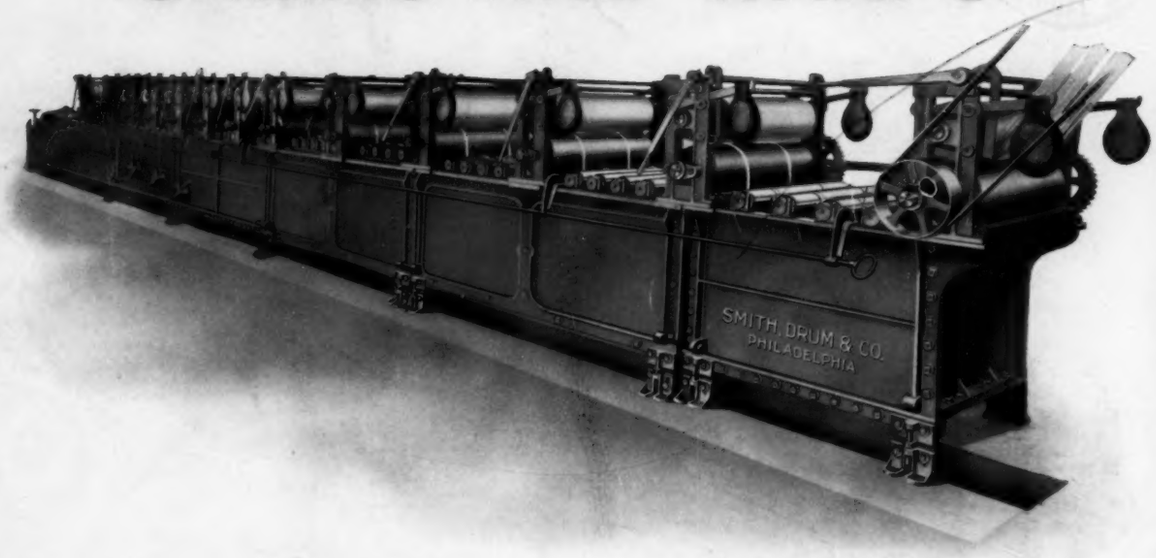
COTTON

DECEMBER, 1913

MERCERIZING MACHINES

FOR

SKEINS AND WARPS



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(This Issue 5,000 Copies)

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KNOCKING THE COTTON MILLS.

Knocking the cotton manufacturer and his business has long been the habit of certain classes of well meaning men and women, who are otherwise good citizens. Occasionally, the editor of a great daily newspaper, usually clear-headed and cool-brained, will shoot off a tangent because the office boy was late, or because the dictaphone records were not shaved when he needed them, and "dish up" an editorial nightmare on the child labor question which will not bear close inspection.

Such an accident occurred on November 13, which in this fortunate instance, did not happen to be Friday, when the editor of the Birmingham, (Ala.), *Age-Herald,* under the caption, "The Cotton Mills," made these assertions:

"In child labor legislation, Alabama, North Carolina and South Carolina still lag behind. In these states most of the work in the textile mills is performed by children under the age of 16. Well organized campaigns to bring the protection of children up to the standards set in other states are well under way. A state's prosperity should not be earned at the expense of helpless little ones."

With the sentiment expressed in the last sentence we are in hearty accord, but we do object to the loose statement of facts. "In these states most of the work in the textile mills is performed by children under the age of 16," says the *Age-Herald.* A very misleading statement to those who never have seen a cotton mill in operation from the inside. To those who know, if it were such a serious matter, it would be a huge joke.

Just for the sake of comparison and as a matter of information we present herewith the figures of the last or thirteenth census for the three states mentioned. These figures are for the cotton mills, and do not include the knitting mills, which were not mentioned in the editorial in question.

North Carolina figures show 47,231 wage earners employed in the mills, of which 51.1 per cent were males 16 years and over; 30 per cent were females 16 years and over, and 18.9 per cent were children under 16 years of age.

South Carolina figures show 45,454 wage earners employed in the mills, of which 56.6 per cent were males, 16 years and over; 24.7 per cent females, 16 years and over; and 18.7 per cent children under 16 years of age.

Alabama figures show 12,731 wage earners employed in the mills, of which 50.2 per cent were males, 16 years and over; 31.1 per cent females, 16 years and over, and 18.7 per cent children under 16 years of age.

Comparing these figures with the editorial statement quoted would indicate that each child under 16 years of age did more work than four operatives of 16 years and over, which is evidently a preposterous assertion.

We are not pleading for sympathy for the cotton manufacturers. They do not need it. But we do ask for fair play. We do ask that editorial writers and others shall not arouse public sentiment against cotton manufacturing as a busi-

ness by the circulation of statements which mangle, distort and eliminate the truth. We do ask that all intelligent persons wishing to discuss the child labor question in public, and particularly in print, make a careful personal examination of the facts before they prepare such statements. They will then do much less harm and perhaps much more good.

OBITUARY.

Readers of COTTON will learn with profound regret of the recent sudden death of William Wilson Finley, President of the Southern Railway and a leading figure in all the movements for the development of the South. President Finley was well known to COTTON'S readers through his many interesting special articles contributed to the January issues and also because of the prominent parts he has taken in every evolution for the South's advancement.

Born in 1853 in Pass Christian, on the gulf coast of Mississippi, he was educated in the private schools of this town and grew to early manhood in the atmosphere of this picturesque section of the South. At the age of 20 he

THE LATE W. W. FINLEY.

entered the railroad business as a stenographer and by 1889 had filled almost every minor position in the clerical department of a number of railroads. In 1886, he was, at the age of 33, a general freight agent of the Texas Pacific Railway. In 1895 he was elected Third Vice-President of the Southern Railway. The following year he accepted the position of Second Vice-President of the Great Northern Railway, but soon thereafter returned to the Southern as Second Vice-President. On the death of Samuel Spencer in 1906, Mr. Finley succeeded to the presidency of the Southern road.

In addition to his exceptional capacity as a railroad executive, he was a gentleman of splendid address. He had the literary faculty, which enabled him to write convincingly on all subjects directly or indirectly related to the development of the country traversed by the railroads he represented, and he had been honored by Tulane University and the State University of Kentucky with the degree of LL. D. Mr. Finley was president, not only of the Southern Railway, but also of the Southern Railway Company in Mississippi, the Mobile & Ohio Railroad Co., the Cincinnati & New Orleans Pacific Railway Co., the Alabama Great Southern Railroad Co., the Georgia Southern & Florida Railway Co., and the Virginia and Southwestern Railway Co. He was also a director of the Chicago, Indianapolis and Louisville Railway Co., the Old Dominion Steamship Co., the Equitable Life Insurance Society, and a trustee of the John F. Slater Educational Fund.

Mr. Finley is survived by Mrs. Finley, Misses Lottie V., Lily G., Leonora, and Celestine Finley, and his son, W. W. Finley, Jr., who is connected with the traffic department of the Pennsylvania Railroad at Newark, N. J.

AN ADDRESS OF GREAT VALUE.

We are devoting this space to particularly call the attention of our readers to the address of President Wallace, of the Southern Textile Association, which will be found on page 46 of this issue. It contains some admirable thoughts for the executive men of the mill and at the same time illustrates well the ends and aims of the association as a whole.

A DIRECTORY OF COMMERCIAL ORGANIZATIONS.

In response to a Senate resolution passed December, last, the Department of Commerce has submitted to the Senate a list of the commercial organizations in the United States. This record, with a list of agricultural organizations, has been printed for distribution, provision being made for 1,500 copies for the use of the Senate. The list of commercial organizations was prepared by the Bureau of Foreign and Domestic Commerce, which for nearly two years has been collecting for use in its own work detailed information regarding such organizations, their functions, membership, income, etc. The information in the files of the Bureau at the time the resolution was adopted was supplemented by such additional facts as it was possible to obtain before February 15, the date on which the list was to be submitted to the Senate, and this list when published will record about 3,500 national, interstate, state and local organizations.

In the compilation of its information the Bureau utilized various symbols to indicate the field of service and the activities of the various organizations. These symbols have been used in the list submitted to the Senate, so that it furnishes in a concise manner a complete record of the organizations, their functions, membership, and other details. The information thus compiled constitutes a directory of commercial organizations of the country such as has never before been prepared, and it should prove of practical value to business men.

In addition to the 1,500 copies printed for the use of the Senate, the list is issued as a bulletin of the Bureau of Foreign and Domestic Commerce (Miscellaneous Series No. 8). Copies of this bulletin will be sold for 15 cents a copy by the Superintendent of Documents, Government Printing Office, Washington, D. C.

STANDARD PROCESSING COMPANY

A New Field for Southern Enterprise which is Proving Successful in Every Respect. Warp Mercerizing and Gassing by the Most Approved Methods and Under Ideal Conditions.

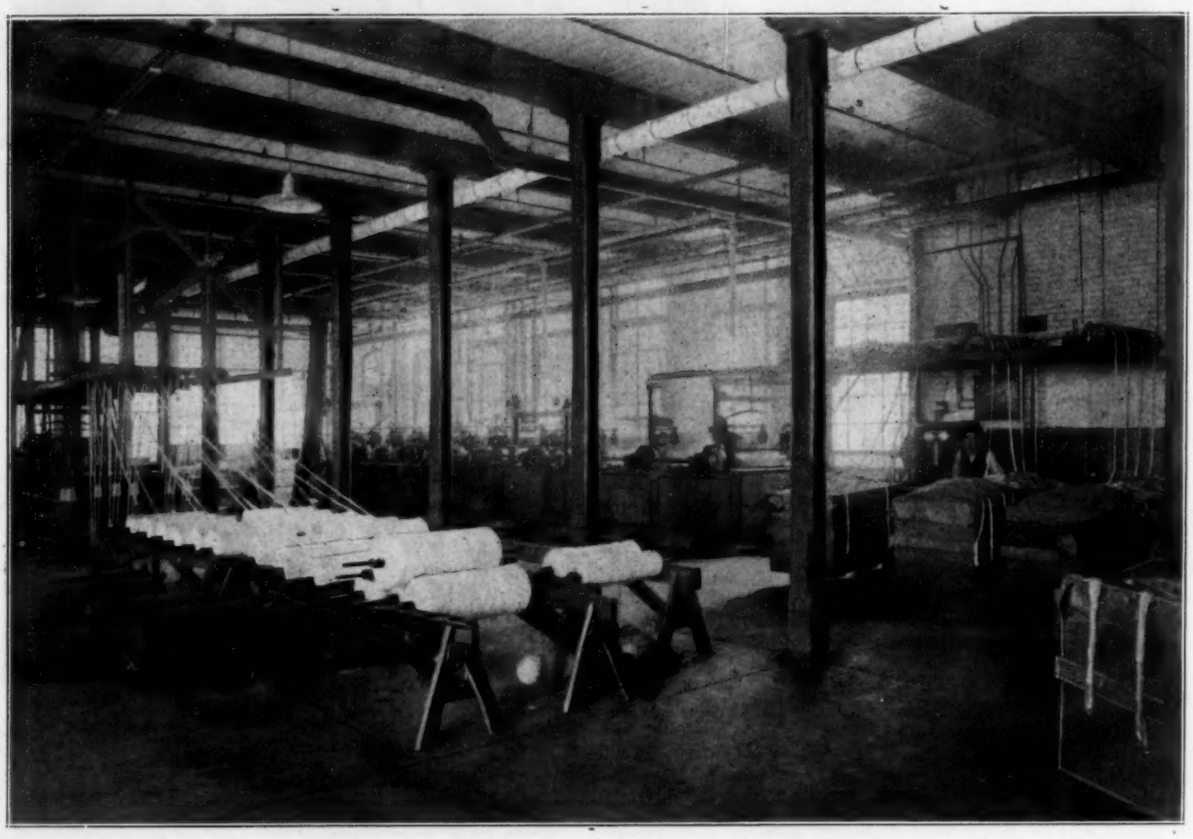
Located at Ridgedale, a section of Chattanooga, Tenn., the plant of the Standard Processing Company, nestles close under the shadow of Missionary Ridge, while across the valley facing it looms the historic heights of Lookout Mountain. The substantial main building is of brick, mill constructed, and flanked by a boiler house and two warehouses of similar construction.

This plant was originally intended to handle that part of the product of the Coosa Manufacturing Company, located at Piedmont, Ala., which had to be mercerized; but the capacity of the machinery installed was large enough so that a considerable quantity of commercial work is being done and with the addition of the new winders now on order, this amount may be increased still more. Furthermore, the south end of the main building is sheathed with boards to allow for the extension of the entire plant at a later date.

A special room has been devoted to the caustic mixing machinery and tanks, and this room also contains cement tanks for acid, and for the use of chloride of lime later, when the bleaching and dyeing sections are established. Bleaching will be by the sodium hypochloride method.

On entering the main building the large, roomy offices are located at the left, presided over by A. H. Thatcher, the secretary and treasurer of the company, and his able assistant, Superintendent P. F. O'Neill. At the right is the main stairway leading to the second floor.

Passing in onto the main floor of the building from the office, the amount of excess room for the processes to be added later is at once apparent. The floor is of cement, sloping to drains at regular intervals, which allows of extreme cleanliness at all times. The ball warps already on spindles as received from the mills, are trucked onto this floor from the receiving warehouse and lined up on stands in front of the boiling-out machine. This boiling out process is to remove the cotton wax and other impurities from the warps before their immersion in the mercerizing liquid.



BUTTERWORTH BOILING-OUT AND MERCERIZING MACHINES, SHOWING STRAW WINDERS WRAPPING THREE WARPS INTO ONE IN FRONT OF THE MACHINE AT THE LEFT.

Directly in front of the boiling out machine, there is located a four-spindle straw winder. In operation, this winder wraps a string or thread around two, three, or four warps, according to the counts, as these warps are passing through a central hole in the machine. This wraps the thread around the warps spirally and prevents the later tangling of the warps while in process. The number of warps run at one time through these winders and the boiling out machine varies from 24 on 30's two-ply, to 48 on 60's two-ply.

The warps are delivered from this machine into boxes or trucks in which they are taken to the back of the eleven-box mercerizing machine, just a few feet away. Here

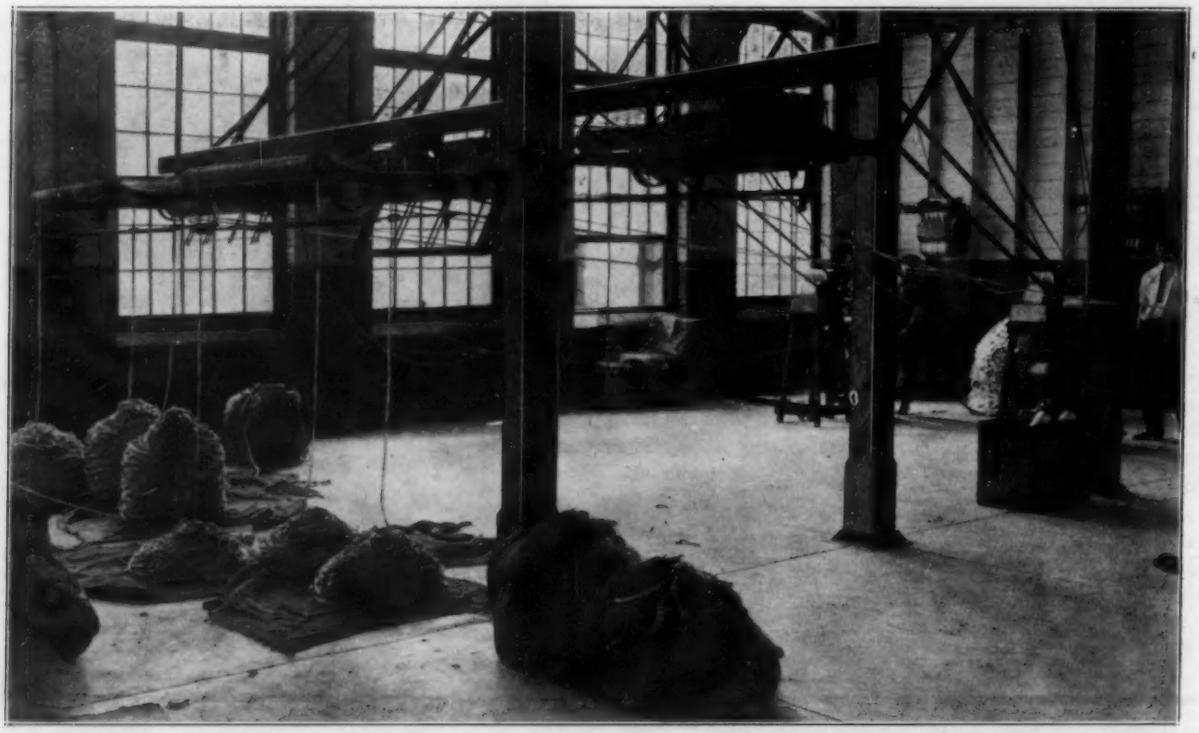
the same number of warps are run through the water, caustic, and acid boxes or tanks, finishing up in a softener and hot water, and again delivered into box trucks. These are pushed through an open doorway into another room directly in line with the mercerizing machine, where the warps are chased over an 18-cylinder can dryer, and returned to the front of the machine over an Eccles coiler, which deposits each separate bundle of warps in coils on the sheets prepared for them.

From the can room, these bundles of warps are taken to the straw unwinding machines which removes the spirally wound threads from around the warps and re-winds it on a spool, after which the warps are separated by pins and are split down to their original size of 378 ends to a warp; again running over coilers and coiling each warp on a separate sheet by itself.

The binder thread is again rewound from its spool onto cones on a spiral cone winding arrangement, when wooden boxes and trucked down a chute or inclined platform at the end of the main building to the finished goods warehouse.

Some of the yarn is also wound in square spools for the weaving trade to be run in with the warp at the slasher for effect threads on men's wear goods. In one corner of the second story of the main building is located the office of David Gravel, the foreman of the gassing, quilling, winding, etc. Mr. Gravel, as well as Superintendent O'Neill, was formerly with the Arlington Mills, at Lawrence, Mass.

One especial point that is worthy of note in connection with the work turned out by this plant, is the even manner in which it takes the dye. From samples of dyed hosiery exhibited, this was a particularly prominent point. In many instances, mercerized yarns when knit into hosiery and dyed, will show a streaky effect to the eye of the experienced dyer when held to the light. Goods dyed from



THE UNWINDING AND SPLITTING DOWN MACHINES SHOWING COILERS IN THE FOREGROUND.

it is suitable to be used over again on the straw winders in front of the boiling out machine.

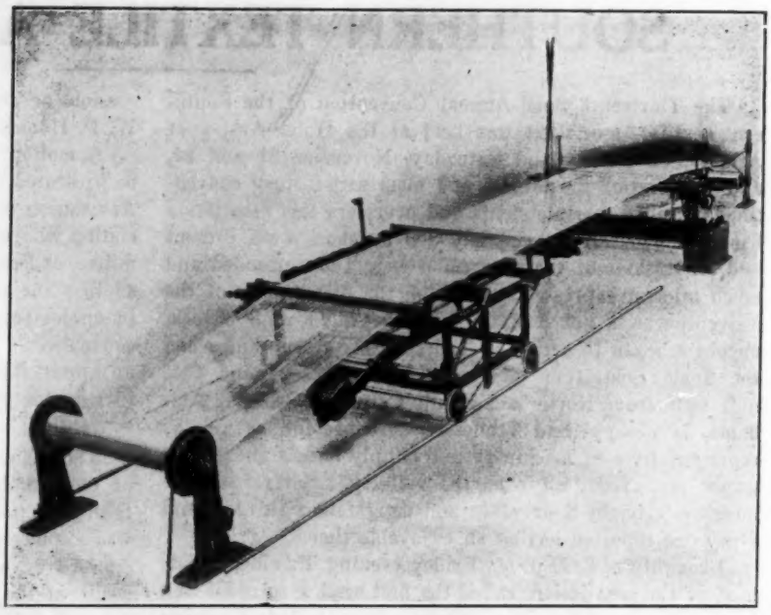
This is the process used on plain mercerized warps, but the plant is also fitted with a Foster gassing machine so that in case gassed warps are required, they may be prepared on this machine prior to the boiling out, previously described. The mercerizing machinery of the plant has a present capacity of about 40,000 pounds a week, if run to the full limit of the machinery, besides the allowances made for extensions which have already been referred to.

After splitting the warps down and separating them through the little coilers, as described, they are taken to the second floor where they are reeled and then quilled on Whitin long chain quillers of 378 spindles each. From the quillers the yarn goes to the Foster cone winders in case the yarn is intended for hosiery mill use. When the warps are intended for the weaving trade, they are bundled up after leaving the coilers on the splitting machines and shipped in that form. The cones are carefully packed in yarns finished at this plant, however, shows the clear, even level effect that every dyer desires and secures when it is possible.

The wooden cases used for packing the cones or finished yarns are made up in the plant from shooks bought already prepared.

Traffic between the second floor or finishing room of the plant and the finished goods warehouse is by means of an inclined platform which connects with the main or freight platform which passes along in front of both warehouses. These warehouses are separated by an elevator compartment, connecting the second story, which is approximately even with the car floors to the basement floor, where the chemicals are stored. Each warehouse opens into the elevator compartment through automatic fire doors, and like the balance of the plant, these warehouses are equipped with automatic sprinklers fed by a 35,000-gallon steel tank. This water supply is reinforced by a supply from the Chattanooga water service.

The warehouses are served by side tracks from the Chattanooga Belt Line System of railway. This allows all supplies to be brought directly to the plant without transferring from the original cars in which they were shipped, and also allows shipments to be made from the plant over any of the ten lines of railroad which radiate from Chattanooga, like the spokes of a wheel radiating from a hub. This belt line of railroad has 50 miles of main line and side tracks, extending around the city and serving some 170 factories, delivering cars to and from all of the railroads lines mentioned. Chattanooga rates apply to and from all points on this belt line, and a nominal switching charge is absorbed on competitive business. This allows the factory to be served by its own side tracks and have the advantage of being located on each of the ten lines of railroad entering Chattanooga.



THE FOSTER GASSING MACHINE.

Electric power is used throughout the plant and the boiler plant mentioned earlier in the article is only to provide steam for mechanical processes.

Quite a number of hosiery mills in the vicinity of Chattanooga use mercerized yarns and it is an interesting fact to consider that the Davis Hosiery Mills, makers of the well-known "Buster Brown" stockings, are now building a branch plant directly across the street from the plant of the Standard Processing Company.

The buildings for this plant were designed by Lockwood, Greene & Company, mill architects and engineers, of Boston and Atlanta. The boiling out machine, the eleven-box mercerizing machine, and the 18-cylinder dryer, were furnished by H. W. Butterworth & Sons Company, of Philadelphia. The Straw winders and unwinding machines were furnished by the Draper Company, of Hopedale, Mass. The gassing machine, and the Foster cone winders were furnished by the Foster Machine Company, of Westfield, Mass. The long chain quillers were furnished by the Whitin Machine Works, Whitinsville, Mass. Formal acknowledgment is due to Messrs. Thatcher and O'Neill for their courtesy and assistance in preparing this description of the first gassing and warp mercerizing plant to be located in the Southern states.

GENERAL VIEW ON THE SECOND FLOOR, SHOWING REELERS, QUILLERS AND WINDERS.

Convention Dates.

The National Association of Hosiery and Underwear Manufacturers will hold the tenth annual convention and exhibition at Philadelphia from May 11th to 15th, 1914, inclusive.

The American Cotton Manufacturers Association will hold the 1914 annual convention at New York on the 26th and 27th of May.

Headquarters locations will be announced later.

SOUTHERN TEXTILE ASSOCIATION.

The Thirteenth Semi-Annual Convention of the Southern Textile Association was held at the Hotel Ansley at Atlanta, on Friday and Saturday, November 21 and 22, and was one of the largest and most satisfactory conventions of mill superintendents and overseers this association has ever had. Approximately 300 members were present and all sessions of the convention were fully attended and much interest expressed. Although the first session of the convention was not held until Friday night at 8 o'clock, members began to arrive on Thursday afternoon, and when the final registration was completed, it was found that mill men from North and South Carolina, Georgia, Alabama, Mississippi and Tennessee were present, as well as representatives of machinery and supply houses and textile paper men from all over the country. Several of the members brought their wives and daughters with them and every one reported having an enjoyable time.

Promptly at 8:30 p. m., Friday evening, President Wallace, of the association, called the first session to order and in the absence of President Moore, of the Atlanta Chamber of Commerce, the address of welcome was delivered by another well-known member of the chamber of commerce and the Convention Bureau of Atlanta, Mr. Lee Jordan, who extended to the association a hearty welcome in behalf of the city and its various business interests. The response to this address was made by Superintendent A. D. Lown, of the Fulton Bag & Cotton Mills, who expressed for the association the thanks of its members to the earlier speaker. Following this, President Wallace made his usual address, which appears in full on another page of this issue.

At the conclusion of this address, Dr. E. H. T. Foster, of Charlotte, N. C., read the paper presented by N. A. Cobb, of Washington, D. C., entitled, "Textile Testing," copious extracts of which are published elsewhere. Following the reading of this paper, W. T. Ray, of Spartanburg, S. C., fuel engineer for the Clinchfield Fuel Company, presented a paper entitled, "Fuel Engineering in the Cotton Mill," illustrated with views from a stereopticon.

At the conclusion of Mr. Ray's paper, it was announced that the paper by B. W. Bingham, of Marshall, N. C., on "Making Yarn for the Market," would have to be omitted, because of Mr. Bingham's inability to attend the convention and the fact that he sent in no paper. The meeting then adjourned and refreshments were served directly in the hall by a force of waiters belonging to the Hotel Ansley.

On Saturday morning at 10 a. m., the business meeting was called to order by President Wallace, at which meeting it was decided to eliminate the afternoon session, which was scheduled for 2 o'clock, in order to allow those members who so desired to attend the football game for the intercollegiate championship of the South between the University of Georgia and the Alabama Polytechnic Institute teams at Ponce de Leon park.

Invitations were read to the association from Greenville, S. C., San Francisco, New Orleans, and the Isle of Palms at Charleston, to hold the next meeting at these places. After considerable discussion it was voted to hold the June meeting at the Isle of Palms Hotel, near Charleston.

The subject of by-laws revision, which was discussed at the Charleston meeting and laid on the table for future discussion at the Atlanta meeting was, on the motion of W. P. Hamrick, of Columbia, S. C., indefinitely postponed.

A motion was also made and carried that all papers to be presented before future meetings of the Southern Textile Association must be presented to the secretary of the association who was also made a member of the program committee, at least two weeks before the date of the convention, so that the secretary could have these papers printed in pamphlet form for distribution at the first session of the convention. This will give the members of the association an opportunity to look over the papers to be read and be in a better position to discuss them upon the floor of the convention hall, than has been the case heretofore.

The chairman of the committee looking to the procuring of the Textile Exhibitors' Association exhibition for some Southern point, presumably the Auditorium of Atlanta, was empowered to act with the committees from other associations or with any other person who could in any way assist in the bringing of this exhibit to Atlanta, and the securing of a joint convention to be held in this city in 1915. The meeting then adjourned.

The Saturday night session was called at 7 o'clock when the entire assemblage sat down to a "Dutch Supper," provided by the entertainment committee, assisted by the mill men, machinery dealers, and others in Atlanta. J. J. Bradley, agent of the Merrimack Mills, at Huntsville, Ala., was called upon to act as toastmaster, and a number of the members were called upon and responded with songs, music and short addresses suitable for the occasion. A telegram from Lewis W. Parker, of Greenville, S. C., told of his good wishes for the association and a resolution of thanks expressed appreciation of those present to the people of Atlanta for their hospitality, and to the committee of arrangements for their hearty co-operation and untiring energy in helping to make the meeting a success. The association was then adjourned to meet at the Isle of Palms, at Charleston, sometime in June, the exact date to be announced later.

It is safe to say that all members who attended the previous convention at the Isle of Palms last June will be present, and that many of them will bring their wives. Those who did not attend last year, had better get in communication with those who did attend and convince themselves that the June meeting at the Isle of Palms is to be the biggest summer outing the Southern Textile Association has ever had, and see that their names are listed as among those present at this big annual convention.

PRESIDENT'S ADDRESS.

"It is indeed a pleasure to meet again with you on an occasion of this kind and I am deeply gratified to see such a large attendance. A good many of you are the Association's 'old stand by's,' and I am proud to know that your heart is still with the Association and its work. I see a good many new faces, which to my mind, is significant of the fact that they are casting their lot with us, seeing or feeling the importance of just such an organization to round out their practical experience, and to make themselves successful mill men of the future. Another fact which is brought clearly to my mind when I see these new

faces, is the spirit of cooperation which has been manifested by the members in putting forth their best energies toward getting new members as well as old members who have grown careless, to take a more active part in our Association, and I am glad to see the results of your labors, and to one and all, I extend my heartfelt appreciation of the support you have already given me, in an effort to have the Southern Textile Association the one association of the South. Especially do I want to express my sincere thanks and appreciation for the efforts and untiring work done by our efficient secretary, A. B. Carter, also for the hearty cooperation of all the committees.

"In an association of this kind, whose object is for the mutual improvement of men who are in charge of plants as superintendents, and men who some day expect to be, and are striving for that end, such questions as they handle should be discussed and are discussed, and papers are read.

"I expect to call attention to a few subjects in order that you may carry them with you as food for thought. The first one to my mind, and one which I have watched with a great deal of interest is 'Village Welfare Work.' It has been proven that to secure the best results and encourage the best, the noblest in a boy or girl, man or woman, you must surround them with conditions conducive

PRESIDENT T. B. WALLACE.

to moral uplift. Moral and mental conditions of every village is one of the gravest questions of today, and how to protect the morals of our girls and boys, because they are the ones we have to start with. No man has ever done a public welfare work that has not been repaid by so doing. The law of sowing tares decrees that tares shall also be harvested, and many of you today are men of families, who have boys and girls growing up in mill villages, and it will behoove you to guard well their surroundings, and you are the men in a position to change those conditions and it is a question which is largely up to you.

"Another thing I wish to call to your attention is one that we have all read in papers for sometime, and that is the change of the tariff downward. The tariff question is one which we, as mill men, are not in a position to dictate to our Congressmen as to whether it shall be raised, lowered, or remain as it was. The presidents of the cotton mills have, from the first introduction of the bill, fought such radical changes as were made and passed; however, with all the opposition from the mill interests that could be brought to bear, the law makers of our country saw fit to enact such a law. The result this will have upon our mills will depend largely upon us. Our presidents have done what they could, now our time comes and we have got to get busy and begin to watch for the little leaks all along the line and cut out here and there such things as have been going into waste. All unnecessary expense must be eliminated, and by so doing, reduce the cost of manufacturing in order to compete with foreign countries where labor conditions are different and operatives more cheaply paid. We have an excellent opportunity to demonstrate what is in us along this line and we must leave no stone unturned until we know that we are getting the highest production at the lowest cost and until we know we are doing this, we are not in position to criticise the change in the tariff rates. We are the men behind the guns, and remember, 'It is not the largest number of shots that win the battle, but the ones that go to the mark.' Examine the individual organization in your mill, find the weak places, then put a hot shot in and wipe it out, and the men who can do these things are assured of a higher position.

"I wish now to place before you for thought a few facts regarding our Association and its work, and the advantages offered by it. One of our principles is cooperation. True cooperation is the help you give and not the help you expect. When there is no spirit of organization, there exists a spirit of selfishness and loneliness, and there is no stronger desire in any human heart than the desire for companionship upon terms of equality. The greatest punishment that can be inflicted upon a man is solitary confinement; and the greatest handicap to any textile plant is to have its men work alone. The law of compensation adjusts all things and he who is served well, serves well, and it is really easy to organize and maintain an association if you are impressed with the importance of the work. Cooperation is not a theory, but a recognized fact. Our large industrial plants are large by reason of their unity of purpose and their 'pull together' method, so we want every overseer, every superintendent, who is not a member of our Association, to come out of solitary confinement and join with us. It is a duty you owe to yourself and your employer.

"Service our employers must have—service, and faithful service at that. There must be no back-biting or underhand work; everything must be fair and above board and the man who knows how to render the best service is the man who is going ahead all the time. The very best collection of theories ever assembled in a man's mind is ineffective, unless backed up by service in applying them. Hot air will sometimes put a man in a position, but will not keep him there after being put to the practical test. The stream that develops the most power when harnessed, is one which moves along quietly. All business has its confidential side and it behooves every young man entrusted with responsibility to know all he can about his employer's business while at it, but he must learn what questions he must know nothing at all about when away from it, and remember the saying: 'The man who knows more than the boss, gets to be boss, and the man who thinks he knows more than the boss generally gets fired.' These are but a

few forms of service and must be mingled with close co-operation between employer and employed.

"The textile industry is a science and success cannot be obtained without study, knowledge, enthusiasm, and properly directed energetic service. The man who attempts to monopolize an idea and keep it under cover, loses it, because we understand a thing best only when we have written it or when we have given it away; that is to say, we never understand a thing quite so well as when we have just explained it to some one else and no man can afford to try to get along without reading a good deal or having the reading habit; neither can a man afford to surround himself with men who do not read. The man who does not read, does not care and is not concerned to know and understand what is best in his field. Oswald tells us 'The mind is a flower that requires a strong physical stem.' The trouble is, too many men try to succeed without the ideas of other men and without the assistance of a strong physical body to support a growing and expanding mind.

"The man who reads—investigates, thinks and looks ahead, is always loyal and dependable. He is dependable because his mind is open to new ideas and these ideas are new methods he intends to use in connection with his business, and when put to the test, 'an ounce of loyalty is worth a pound of cleverness.' The man who has not cultivated the reading habit is dangerous to the interest of good business, because he does not keep in touch with ideas that make for economy. His methods are slow and old-fashioned; his ideas are crude and uncertain, unreliable and expensive. Any business concern is largely a composite of the ideas of other business concerns and any successful man is in a very great degree a composite of the ideas of other men, as there is no such thing as knowing it all, and there is no such thing as success without the ideas of others, and no man can know the efficient practical way of doing things without first having cultivated the reading habit.

"Again, the textile industry cannot grow without capable superintendents and overseers, neither can the superintendents and overseers get what is justly theirs without having affiliated with the Southern Textile Association. There is no investment you can make that will pay you as large dividends and provide such satisfactory results as that obtained through a well organized textile association. My friends, if you are a member and do not attend regularly, you cannot expect to get full benefits from the association. No officer or number of officers can do the whole work, but the combined efforts of each individual member is required to make our meetings and association successful.

"I wish to express thanks to the mill presidents who are encouraging their superintendents and overseers to join with us and I feel that they will receive good returns in exchange for this encouragement; and for the benefit of those who have not yet investigated far enough to understand our aim, I wish to say there is absolutely nothing antagonistic to their interests. Our teachings are loyalty and subordination to our employers and our association is one for mutual improvement. We do not try to secure any secrets peculiar to any mill, but questions common to all textile plants are discussed and the only recognition we ask of the mill presidents is to encourage their men to be as progressive as those who are encouraged by their presidents to associate with us.

"In conclusion, let us not forget the great fact that Divine Providence has created us absolutely dependent on each other, and when a superintendent or overseer fails to take notice of this fact, he is ignoring the basic principles of success (morally, spiritually, temporally and financially). No one has ever performed a generous, kindly act which has not returned a hundred per cent of profit, in return. So let us, as enlightened men, endeavor to make our home association a school of learning and inculcate a broader measure of brotherly love and kindness to each other, and in this way secure confidence and enthusiastic support and cooperation in our textile association. It will be surprising to see what results can be obtained by a careful and generous effort in the work. Let us throw off every thought of selfish action and adopt the rule of trying to benefit each other, and in so doing we will benefit all. This will inspire confidence and place our association on a higher plane and secure for us the fullest measure of success through our organization."

TEXTILE TESTING.

BY PROF. N. A. COBB.

The official cotton grades at present take cognizance of only two of the important qualities which determine the value of cotton, namely (1) the color and (2) the amount of waste. Any complete system of standardization of cotton will, however, have to take into consideration, among other things, (3) the length of the fiber, (4) the strength of the fiber, and (5) the clinging qualities of the fiber. Most of these qualities are of such a nature that they can be satisfactorily determined only by means of spinning tests, and it is for this reason that the Department for several years has been making spinning tests with cotton in the mills and textile schools of the country.

The experiments consisted in spinning cotton of known history into yarn under definite conditions, as nearly as possible approaching commercial conditions. The qualities of the resulting yarn have been tested, and by comparisons the desired results have been secured. In this way, it has been shown how cotton is affected, that is, improved or injured, when grown in certain ways or handled in certain ways.

The last appropriation bill of the Department of Agriculture was so amended in the Senate as to direct the Secretary of Agriculture to make tests as to the waste, tensile strength and bleaching qualities of the various grades of cotton as established by the government.

These experiments are being conducted in part at the Riverside and Dan River Cotton Mills at Danville, Va., and are being so carried out as to reserve at each stage of the manufacture a liberal supply of the material. It is intended that this reserve shall be used in making fifty sets of exhibits to accompany the full report. Each exhibit will consist of twenty-five to fifty boxes or cases containing samples of waste, sliver, roving, yarn, etc., of such size that their commercial qualities can be estimated by those versed in the art. It is intended to distribute these exhibits in such a way as to make them accessible to growers, buyers, manufacturers, and educational institutions.

In making these waste, tensile strength, and bleaching tests of the official grades of cotton, only the grades middling fair, good middling, middling, low middling and good ordinary have been used. This method makes it possible to test a larger number of bales of the respective grades and gives a more accurate average. The qualities of the intermediate grades may then be interpolated. Since

there is some difference in the spinning characteristics of eastern and western upland cotton, the test has been divided into two parts. Fifty to sixty bales of the two respective growths, or an aggregate of one hundred to one hundred and twenty bales have been selected—i. e., ten to twelve bales of each grade of both Atlantic states upland and western upland cotton. In order that the tests may be comparative, each lot has the same length of staple, one inch. There is probably more fifteen-sixteenths of an inch to one inch staple produced than any other one length in both the Eastern and Western upland cotton.

The cotton was secured in June, 1913, from different firms and amounted to 123 bales. The cotton thus secured has been supplemented by a few bales from other sources. The cotton was shipped early in July to Danville, Va., where all of it was stored on the same warehouse floor and allowed to stand until the first of October, so that the bales in spite of their varied origin, might come to the same condition as to moisture and so forth.

Thirty-five pounds from each bale was sent to the Textile Department of Clemson Agricultural College, Clemson, S. C., and thirty-five pounds to the North Carolina A. & M. Textile School at Raleigh, N. C. Thirty pounds of each bale was reserved for use in the preparation of record sets. The cotton remaining at the Danville Mills was thoroughly mixed and allowed to stand for a day or two before entering the beaters. A composite sample was taken from each lot of ten to twelve bales so mixed and sent to Washington for accurate tests of various kinds.

The same number of yarn (20's-22's) was made at the mill from each grade, using the regular mill machines and methods, with the speeds, settings, relative humidity, and other factors the same for each grade of cotton. The organization and other figures were determined upon by consultation with a number of representative American mills, the officers of which generously undertook to examine and comment on the figures first determined upon by the Department experts, D. E. Earle and W. S. Dean. In this way mill conditions representative of American practice were secured.

In spite of the fact that some of the grades would rarely be spun into yarn of these sizes, it was thought best for various reasons to spin all the grades into one size of yarn at the Danville mill. The same cotton was used in smaller quantities at the two textile schools and spun as nearly as possible under the same conditions. At one of the schools the mill tests will be duplicated; at the other, a variation will be introduced, in that each grade will be used to spin the size of yarn for which it is best adapted, so that when the entire series of experiments is completed, the results will present as many-sided a view of the question as possible.

Approximately two bales of each grade were bleached in the raw and the same number of yarn made from each bleach at Danville. With the exception of one bale of Western Good Ordinary, no difficulty was encountered in bleaching.

About twenty-five pounds of waste, or as much thereof as is produced on the different machines for the respective grades, was marked and sent to Washington, where waste types will be prepared for determination of value. For careful examination as well as for exhibition purposes, the following types of waste were collected from each of the ten tests:

About 25 lbs. each of opener and breaker lapper motes; intermediate lapper motes; finisher; card strippings; card toppings; and card flyings and motes.

A record of the white waste made in spinning the respective grades was made, as well as the scavenger and clearer waste. Hygrometers were placed in the various mill rooms and readings made hourly. A relative humidity of about 55 degrees for the picker and card rooms and 65 degrees for the spinning room was maintained so far as practicable.

No serious difficulty was encountered in securing, in the month of June, 1913, sufficient cotton for these tests. It was, of course, necessary, considering the nature of the experiment, that each bale of cotton be of very uniform character and exactly of the specified grade. Samples drawn from the accepted bales have been inspected by dozens of well-known experts from all parts of the cotton-growing and cotton-manufacturing regions of the United States, and these experts, without exception, have declared the samples to be excellently selected.

While this cotton is now well through the mill, so that the success of the experiment is assured, it is not yet possible to draw more than tentative and approximate conclusions. It seems safe, however, to make the following statements.

The two classes of cotton, western Upland and Atlantic states Upland, have yielded a visible waste of slightly different weight and character, the average difference in percentage of waste being between one and two per cent, taking all the grades into consideration. This difference obtained in the mill has been paralleled by carefully made hand-separations. In the hand separations, the average differences in waste was about one and three-fourths per cent. On the whole, as would be expected, the differences are considerably greater in the lower grades than in the higher grades. The highest difference so far noted was the following, but so large a difference appears altogether exceptional.

VISIBLE WASTE, HAND SEPARATED.

Atlantic States Upland Good Ordinary.....12.49 per cent.
Western Good Ordinary ..... 7.80 per cent.

The corresponding medium difference was the following:

MILL WASTE (VISIBLE).

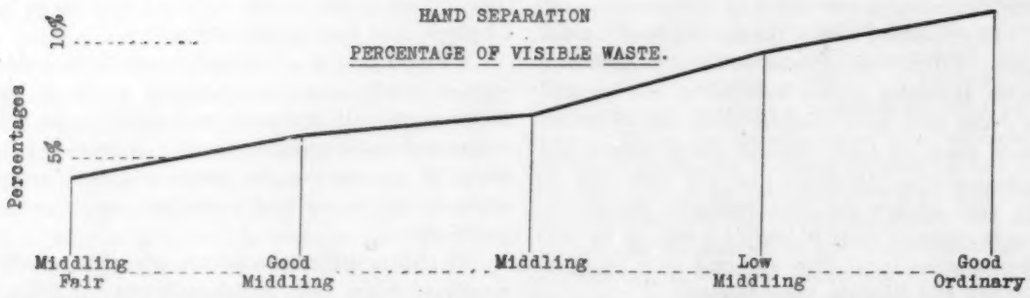
Atlantic States Upland Good Ordinary....12.57 per cent.
Western Good Ordinary .....10.08 per cent.

The value of the visible waste from the various grades has yet to be determined, but from its character there can be little doubt that the valuation figures for the waste of the two classes of cotton will be approximately equal, weight for weight.

Preliminary and approximate figures have been obtained concerning the tensile strength of the yarns. These tests show the yarn from the two classes of cotton to be about equal in strength.

As regards the relative amount of visible waste in the different grades, the figures are found to be more consistent than might have been expected. The mill waste in the experiments to date varies from about four per cent in Middling Fair to about eleven per cent in Good Ordinary, and the various Official Grades fall into line with something approaching mathematical uniformity, as will be seen by examination of the following diagram.

It must be carefully borne in mind that the cotton used in these investigations was all of the same length of staple. It will be seen from examination of the purchasing sources that most of the Atlantic states Upland cotton



has probably come from the Piedmont and similar sections. An examination of the census bureau statistics for the last five years indicates that about half of the Atlantic states Upland cotton is found to originate in these sections. The other half of the cotton used in the tests came from the Gulf states and Arkansas.

Although these figures are the result of experiments on only one season's cotton, they are presented with confidence in their approximate accuracy so far as they go. The investigations have been carried out with much care. No detail received greater attention than that of suitable and uniform humidity. Among other precautions taken was the halting of the experiments for three months in order that the work might be done during the most suitable spinning months for the region (Danville, Va.), namely, those of October and November. Hence the mill experiments began on October 1, 1913. Unfortunately, however, the weather during the first weeks of October was about the most varied that had ever been experienced in Danville. Everything was done to offset this disadvantage by as careful internal control of the humidifiers as possible. Furthermore, the precaution of reserving two hundred pounds of each grade somewhat short of the spinning stage had been observed, and it was possible later to put this amount of each grade through the spinning processes on the same day, thus securing a relatively small amount of yarn more strictly comparative than would otherwise have been possible. The final figures will be ready for publication in the course of a few months.

FUEL ENGINEERING IN COTTON MILLS.

EXTRACTS FROM A PAPER PRESENTED BEFORE THE SOUTHERN TEXTILE ASSOCIATION.

BY WALTER T. RAY, FUEL ENGINEER, CLINCHFIELD FUEL CO.

Waste is nothing but waste. No one benefits from waste in even the slightest degree. There is more waste of fuel and power in every industry than of anything else, even of labor; so in the new profession of fuel engineering there is a chance to be of great benefit to industry and mankind. Any cotton mill engineer competent to follow the power will find a superintendent somewhere glad to have him do it, and it will be one of the objects of my talk to convince the higher men who manage and own the mills that it will pay them to encourage the search for means of spending money wisely.

The immediate province of fuel engineering has to do with the purchase, transportation, unloading, firing and burning of fuel, and the removal and disposal or sale of the refuse; fuel engineering also has to do with the operation of the coal-consuming apparatus, such as boilers and stacks, its modification to secure greater reliability, output and efficiency, and the choice and installation of new apparatus; it also includes the handling of all the employees having to do with the fuel and power, for the human element is the most important of all, capable of the greatest improvement, if led and not driven.

At first thought it seems aggressive to include the purchase of fuel in fuel engineering. I believe the man responsible in a broad way for results ought to be broad enough to buy honestly and efficiently all the materials for whose cost he must account in the price of his output.

Unloading may seem to be a small item, but the use of a trestle in a convenient position may easily save ten to fifteen dollars a car compared to some other arrangement. There is also to be considered the adaptation of the unloading process to the weighing of coal as used, so that the accuracy of the records may not be eliminated by sneaking in coal from another part of the pile, or by neighborhood theft. It is also of advantage to have a trestle so designed that doubtful cars of coal can be separately dumped and kept unmixed until a representative of the coal company arrives. The floor of the bin should be concrete, to keep dirt from being mixed with the coal, which mixing usually results in troublesome clinkering, and to afford easy wheeling into the boiler room.

The importance of firing coal well, and the rare attainment of a good result, are so universally known as to make me hesitate; it is like getting up early in the morning, we all realize the importance of it, but all try to doze a little longer. An ordinary mill fireman burns about $35 worth of coal a day, for which he gets about $1.15 for ten or twelve long hours. Now, I am not advocating more wages for the same work, but I am advocating any of the proven bonus systems, carefully thought out to give everyone a square deal. Of course, such labor usually can not stand prosperity at first, and a bonus system has to be designed so as to elevate wages more and more above the neighborhood level, as the weak ones are gradually dropped, and higher-grade labor hears of the better opportunity and comes in.

When it comes to working fire room labor on the bonus system, it is found necessary to equip the boiler house with some instruments, which usually represent a not insignificant investment, but which really ought to be in place already. I refer to coal scales, a water meter on the feed-pipe line, a steam meter on the steam header, recording thermometers on the feed water heater and in the boiler breeching, recording steam-pressure gauges, and, in the case of medium and large plants, a recording flue-gas analyzing machine, or a cheaper substitute therefor. It is to be remembered that in the boiler room we burn money—about $35 per day per fireman. If only 10 per cent of this be saved, we are ahead $3.50. Of course, the use of such instruments will require the supervision of a skilled and

competent man, especially at first, but it is surprising how soon very ordinary labor learns to take an interest in such instruments, and to watch them.

I have listed the burning of coal separately. Coal burning is a function of the furnace, being modified by the type of grate, the shape and size of the furnace, the cooling effect of the boiler, the "draft" produced by the high or low stack, and many other factors, mostly beyond the engineer's control, but mostly capable of improvement when the next addition or modification is made. In other words, the burning of the fuel is largely a matter of furnace design.

The disposal or sale of the refuse is sometimes of more importance than people think. It often contains too much coke, and frequent samplings and analyses should be made. Sometimes the clinkers can be screened out and crushed and sold at a small margin of profit for sidewalk concrete, or else used in making such walks round the mill village. Very rarely it is possible to sell refuse. It is usually feasible to devise some way of disposing of it at a lower labor cost in any event. A man will sometimes devote much study to saving a few cents a ton on handling his coal into the boiler room, and go on spending half a dollar a ton removing one-tenth as much ashes.

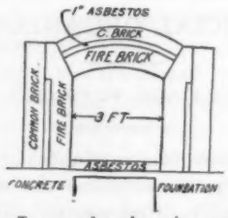
No new apparatus should be selected until consultation is held with the man who has spent years of hard work near boilers and machinery; he has a fund of practical experience which should be thoroughly utilized. With him reliability is the first test of any innovation. There is a general complaint among consulting engineers that the plant men are antagonistic to improvements and changes proposed by themselves; personally my opinion is that the objections are often well grounded, and that if the consulting engineers would consult with the operating engineers at every turn, they would learn a good deal, and teach a good deal, and every one would be happier because of the resulting installation, of more practical as well as more efficient equipment.

I cannot emphasize too strongly the value and ultimate cheapness of a high stack. Every foot above 150 feet is worth its cost many times, and no new plant should be installed with a stack a foot under 200 feet in height. A world-famous engineer wrote that if a fireman had plenty of draft he could do wonders, but that if his draft was weak, God would have to help him, but that the owner might have to flee the devil. Unless there is at least a fair draft, attempts at improving the efficiency are apt to fail unless very carefully calculated beforehand. Further, the same amount of additional money expended on increased height of stack will buy more steaming power than though spent on additional boilers.

Henry Kreisinger, formerly associated with me, devised a diagram showing the present losses from coal to cloth, which was illustrated and described in COTTON for August, 1913. Revising these losses according to what my personal experience suggests as feasible, we get the following comparative result.

The figure, 5.05 per cent. of the original heat of the coal being put into the actual working of the cotton fibers obtained by me is high, much higher than Mr. Kreisinger's figure of 3.50 per cent.; but I took the high figures for present-day performances all through the calculations. Contrariwise, I took the doubts against the efficiency of all changes and modifications I had in mind, so that the figures of a possible utilization of 8.75 per cent is low. Now, 173 per cent is almost twice 100 per cent, that is, 8.75 per cent is almost twice 5.05 per cent, so that it appears the average mill might cut its coal consumption almost in two, partly by the expenditure of a few thousand dollars here and there, but mostly by highly-skilled operation. Formerly it was believed that when a plant was installed all the highly intellectual work was done, and that thereafter the machinery would run itself, while a few cheap men looked on. But it is coming to be realized that the operators of large plants, who keep the wheels moving, should be higher-class men than the designers and builders, because they should have not only as thorough a knowledge of the fundamental principles on which the machinery operates, but they should also be able to invent and make improvements in mechanism and operation; and, further, they have to handle diplomatically large numbers of human beings. Thus there is arising a new class of engineers,—operating engineers whose skill and learning will be on quite as high a plane as those of the many other professions.

Most of the boilers to be installed hereafter, as heretofore, will be horizontal return-tubular, or multitubular fire-tube boilers, because they are cheap and fairly economical. I wish to put in a word for smaller tubes and a few more of them. A boiler equipped with 3-inch tubes will save its cost, in fuel, over a boiler containing 4-inch tubes, in about a year.



The illustration I am showing is a cross section of a combustion chamber. You will notice both the sides and the top are lined with 9 inches of firebrick. Outside the firebrick there is a 2-inch air space on the sides, and a 1-inch layer of asbestos fiber on the top. Then outside the air spaces are 8-inch walls of common brick, and above the asbestos a 4-inch layer of common brick. It was found by careful experimenting and measurement that about twice as much heat passed through the side walls and air spaces per square foot of their area, as through a square foot of the roof, because the asbestos was an excellent non-conductor of heat. This is another point for saving coal.

Some months ago the president of a cotton mill came to me regarding the difficulty he was having in getting a constant percentage of size into his yarn; it varied by several hundred per cent, from the lowest to the highest amount, during the same day, and this notwithstanding that he had one of the best size cooking, mixing and circulating arrangements I have ever seen. Inasmuch as the mill was on electric power, and used steam only for slashing and heating, the fireman also acted as a messenger and general utility man; consequently the steam pressure was very irregular. We loaned him a recording steam gauge, and he got a messenger boy and put the fireman to firing only, after which the steam pressure was very steady. The fireman soon came to take a pride in making a constant-pressure line on the gauge, and the troubles have largely vanished. The great constancy of sizing has a beneficial effect in all the after operations of the mill and it is likely that in general ways the recording gauge pays for itself about once a week.

I might cite many other similar instances, but they

would all point the same moral—that the installation of recording instruments pays handsomely, *if men of the right grade are employed to watch them and look over the charts, and are paid according to their ability.*

It may be of interest to list the various kinds of recording instruments already available at reasonable prices; the names of their manufacturers may be obtained from the editors of various cotton trade papers, and of engineering periodicals.

Steam gauges for boiler pressure; receiver pressure; and condenser vacuum pressure. Feed water meters. Steam meters. Thermometers for feed water, condensing water supply, condenser discharge, flue-gas temperature, slasher-vat temperature and weave-room temperature. Draft gauges for stack draft and furnace draft. Relative humidity recorders. Flue gas analyzer.

It has been my motive to show those absent, as well as those present, how large a field of work is almost untouched. As industries of all kinds get older the margin of profit diminishes, especially in a line of manufacturing as thoroughly standardized as that of making cotton cloth. Consequently the demand for skilled managers will be greater and greater, and it only remains for those who have had much practice to acquire much sound theory, and claim their reward.

COMMERCIAL ORGANIZATIONS.

BY FRANK W. NOXON.*

Some of our most firmly established institutions have been added since the Constitution—for example, universal human freedom, the political party, the secret ballot, the gold standard. The people have adopted these factors and have ceased to think about them as subjects of controversy. The commercial organization is one of these. It has become a permanent incubator of national institutions.

What is the attitude of the general public toward commercial bodies? I believe the public welcomes them, believes in them and looks to them for fundamental and far-reaching results in making America a better place to live in. These bodies originate with the people. In the local organization rival joins hands with rival, one trade with another, all working for the prosperity of the city. In the national or district trade body, competitors sit elbow to elbow laboring for conditions under which to create business for which all may compete. Some of the large industrial combinations think it wise to refrain from joining commercial organizations. The membership is usually composed of independents. In this National Chamber we all unite for the benefit of no particular city and no particular trade, but of all cities and all trades.

Throughout the whole movement lies the idea of getting together for the general good of all, sinking individual interests and differences. Commercial organization means doing in concert things that will bear the light of day. Whatever proposal comes up to the departments or to the law-making branch in a city, state or nation, as an expression of opinion by the business bodies of the territory affected, can be depended upon to have had all the private interest boiled out of it. When you get the voice of united business bodies anywhere, you are getting public opinion.

*Extracts from an address before the National Chamber of Commerce.

Still another thing which would win for commercial organizations the confidence of the nation is their permanence. The city, state and federal governments, in spite of all the progress in making the civil service permanent, have still a large proportion of shifting officials, all of those elected and many of those appointed. A continuous commercial association, with its experience, its knowledge, its records, is a vitally helpful agency in minimizing waste and loss of efficiency resulting from changes of official personnel.

Civilized standards spread faster nowadays than formerly, because mechanical agencies of communication and intercourse have been invented. As with mechanical progress, just so in the domain of civil institutions. The commercial associations is an agency of acquaintance and co-operation. We have three and a half million square miles of territory, enjoying several climates, comprising many regions, each with characteristic population and products and typical institutions, governed through 48 separate republics. How are we to transform this heterogeneous empire into a nation? Chiefly by calling into play for the national service men who are accustomed to getting things done efficiently, and who are so well known in their several communities from Savannah to Seattle that they can expect public support for almost any project on which they and their constituents are united.

Two currents of thought run through these organizations. Concerted action, bringing every man's unselfish side to the fore, tends to promote a spirit of national altruism. But no organization acts until there is among its members a substantial sentiment, usually more than a majority sentiment, in favor of a proposal. Still more deliberate is the process of winning over the support of enough organizations to constitute a burden of public opinion. Thus, the country is protected on the one hand against dry rot and on the other against undue readiness to take up with everything new. We have altruism but we are inoculated against altruenza.

Much remains to be done in acquainting the citizens with the work of the government and with its needs. Improvement in administration and in legislation can be substantially assisted with the co-operation of an interested and organized public.

The national tradition which we are all interested in establishing is that nothing is too good for America; that administration cannot be too efficient, legislation cannot be too enlightened, no foreign country can develop an improvement too valuable for us to have if we want it. Security of tenure, greatly as it has enhanced the seductiveness of the civil service, is not enough; and a further enticement to able and well-trained men for the national service should be provided in the shape of generally accorded recognition and of somewhat higher salaries. Our job is to make such a place for efficiency that nobody in any way will any more think of attacking it than he would Bunker Hill monument or the memory of George Washington.

The commercial organizations of the United States can, if they will, set up in the affections of Americans such an attachment for efficiency in administration and painstaking enlightenment in legislation that every time a citizen thinks of the public service he will feel a thrill of satisfaction and a sense of security, and every time his support for improvements is asked he will respond as he does to the flag.

Mill Conditions and Market Reviews.

SOUTHERN MILL SITUATION.

PROMINENT MILL MEN EXPRESS OPINIONS CONCERNING MILL CONDITIONS IN THE SOUTH. HARD YARN SPINNERS HAVE MEETING AT CHARLOTTE.

(*Special Correspondence*).

"Taking the Cheerful View," appears as a heading over an editorial in a recent number of the Saturday Evening Post, wherein it is stated that "up to the moment the Underwood tariff act was signed textile utterances were generally of the gloomiest nature. Since that moment we detect a new and more cheerful note." Here, for example, is an expert speaking to cotton manufacturers:

"Tariff revision will compel manufacturing and distributing economies drastic and far-reaching in their nature. That we can become important factors in world trade is conclusively proven by Canadian statistics. Our trade with Canada has practically doubled in three years. Our sales of cotton cloth to Canada in three years have risen from three-quarters of a million to two and a half million dollars, in spite of a twenty-five per cent preferential to England. Doing so much across our northern border with unusually strong odds against us—not only the British preferential tariff, but a "dumping duty" which prevents us from using Canada as a bargain counter—what might we not do in other countries by proper organization and effort?

On October 27, an organization of a National Association of American Cotton Exchanges, together with a decision as to the adoption of Liverpool standards in cotton grades or those recently fixed by the Department of Agriculture, were taken up by a delegation at Washington of representatives of cotton exchanges from New York, New Orleans, Dallas and Galveston, Texas, and other cotton points. A resolution was adopted recommending the establishment of a national exchange association, so that there might be nation-wide action on matters affecting exchanges, without reference to location. Secretary of Agriculture Houston, who addressed the meeting, declared the difference between the Liverpool and the proposed American standards were slight, but he believed action by Congress would be necessary to establish the latter.

At the recent session at Mobile, Ala., of the Southern Commercial Congress, the federal government was called upon in a resolution to furnish early in each year the cotton spindle capacity of the country so that the producer may have an equal advantage with the consumer in this respect. The congress also urged that cotton be graded at the gin under federal supervision, in order to save the great total loss caused by taking samples from bales, and that bonded warehouse receipts be given certifying the correct weight and grade of the product.

Trying to get a line on the cotton situation, the New Orleans Times-Democrat notes the range of estimates as between 13,500,000 and 15,700,000 bales in connection with the fact that the world last year consumed a million more bales of American cotton than were produced. To make up the deficit, reserves were brought forward from the large crop of 1911, thus filling the gap. It is said that these reserves have now been used up, and that current consumption must therefore come entirely from current supply. The question arises as to what will happen, then, if the 1913 crop falls materially short of 15,000,000 bales. The Times-Democrat states that the "theoretical deficit would have to be bridged by a corresponding shrinkage of trade. This very thing has already happened, and many a rich bull has 'gone broke' with all the statistics on his side."

Notwithstanding the defeat of the Clarke cotton-tax rider on the tariff bill, members of the New York Cotton Exchange anticipate, with good reason, more drastic proposals of the same general nature and, therefore, they are somewhat moved to deprecate attack. A resolution was recently adopted by their board of managers calling for the appointment of a committee of seven to consider several proposed reforms; first, the question of changing the present standards; second, the question of making changes in the contract; third, general conditions of cotton trading in New York. A report of some sort is expected from this committee at an early date. Meanwhile, it is said that the exchange will not follow the example of New Orleans and other Southern exchanges in adopting the government standards unless the Agricultural Department agrees to supplement its standards with those of "upland" cottons, because, among other alleged reasons, the standards used by the Liverpool and Bremen exchanges and foreign exchanges generally, correspond more to American upland cotton than to middling gulf. Apparently the disposition is to make considerable concessions if it seems probable that the hands of the assailants will thereby be stayed. Uncertainty herein holds up action.

The cotton trade for the next few weeks will be more concerned than ever with guesses on the size of the crop. From now on all estimates will lead up to the big estimate of the year, that by the Department of Agriculture, which figures will be issued early in December. Picking is now nearing completion and ginners and receiving points can begin to estimate with a fair degree of accuracy how much of the crop is yet to be handled. Statistics regarding mill takings and probable consumption are growing in interest, and fears are entertained by many that the present crop will not be adequate for all needs. Others, however, take the "bear" side of the argument.

A few days ago Neill Bros., of London, issued a circular letter, in which they estimated consumption for the current statistical year at 14,800,000, while they estimated the crop at 13,800,000 bales. Many experts substantially agree with Messrs. Neill in their estimate of this year's crop, and their forecast of the world's needs is borne out to some extent by the spinners' takings from week to week.

Figures from the census bureau tell us that the development of the cotton manufacturing industry in North Carolina has been so steady and upon such an extensive scale as to bring this state second in importance to Massachusetts. There have been some guesses on the North Carolina crop, and if ginners' reports are to be depended upon, the crop for this state will reach the neighborhood of 900,000 bales.

For the purpose of counseling together as to the status of the industry, a well attended meeting of the Hard Yarn Spinners' Association was held in Charlotte on November 19. The sessions were held behind closed doors, but it is understood that the selling end of the business was the

principal feature discussed, the feeling of a number of the members being that the attitude of some of the commission men was possibly in favor of the customer, and any question of doubt as between the mill and the customer was arbitrarily settled in favor of the latter, whenever possible. It was thought that greater cooperation with the mills from the commission men would tend to improve conditions, and possibly create a better feeling all around. The meeting was entirely harmonious, and was designed for the primary purpose of reaching some basis of understanding.

When interviewed by COTTON'S representative, HON. G. GUNBY JORDAN, President of the Eagle & Phenix Mills, at Columbus, Ga., said:

"The tariff agitation is luckily behind us. Whatever hesitation or uncertainty grew out of that situation, is now a matter of the past. The currency bill is reaching a point where we can reasonably hope for something definite to be done in the near future. These two matters of legislation have had much to do with the hesitation in trade that has occurred during the year.

"In the particular character of goods that the South produces, there has been a fairly good trade, sometimes approaching activity. Things have quieted down recently.

"When we know that the steel mills are only operating 60 per cent of their capacity, and haven't orders for that much of the capacity, possibly not over 40 per cent, we well might watch this barometer.

"Cotton is high—too high for cotton mills to make much money out of. Wholesale and retail dealers in dry goods, alike, had allowed themselves to become practically bare of goods, and they had to purchase a certain amount of goods this year to meet the demand of the regular trade.

"Luckily, the Columbus mills are all in full operation. All of them seem to be sold ahead at the moment, and at some profit. But the margin of profit is quite small at present, owing to the price of the raw staple.

"The labor situation has been normal during the year. In fact, there has been less complaint than usual.

"Speaking from a narrower standpoint, the mills with which I am connected show an increase in the amount of sales this year over last. This comes largely from the increased price of goods.

"This has certainly been a banner year for Georgia, take it as a whole. The cotton produced was of a high grade—much better than that in the states west of the Mississippi—which gave a relatively fictitious value to the Georgia crop. This, in turn, has been a great benefit to the farmers, enabling them to pay out of debt, and they are at the moment fairly comfortable. Collections have been good. The banks have done well, and money matters have eased up somewhat, as should have been the case.

"We have hardly had time to test the working of the tariff as yet, but it is not believed that on the character of goods made in the South, there will be much effect from the lower tariff. There have been some compensations granted, the tariff being reduced on machinery, dyestuffs and other essentials. Most of the mills have felt the necessity for brushing up—that is, putting in the latest machinery, new appliances, instituting new economies. So, all in all, the reduced tariff may eventually be of great service.

"The country is in splendid condition, and there seems to be no reason why the cotton mills should not have a reasonable amount of this prosperity. This, at least, seemed true during October, as the census department reports 30,833,000 spindles, consumed 542,000 bales of cotton for that month, which is the record of spindles and consumption of any previous month in the United States."

On asking COL. LEROY SPRINGS, President Lancaster Cotton Mills, Lancaster, S. C., Kershaw Cotton Mills, Springstein and Eureka, at Chester, S. C., and the mills at Fort Mill, S. C., for his opinion as to the business outlook generally, he said:

"I don't think it is possible to forecast with any sort of accuracy what effect the change in tariff schedules and the placing of many articles on the free list will have on the cost of living. I am confident, however, that the business interests of the country will welcome the passing of the uncertainty that has handicapped them, and I believe, now that the measure has passed, it will have a stimulating effect on business activities, and I do not look for the degree of disturbance that has ensued on the passage of other tariff bills, either as affecting labor or trade. I believe that American brains, industry and ingenuity will be able to cope with any conditions likely to arise under the new tariff schedules, and that our manufacturers will meet the competition of the world and hold their own."

We note in a recent issue of the Wall Street Journal that H. G. WELBORN, President of the Hampton Cotton Mills Company, a $7,000,000 textile corporation, with mills located in and around Columbia, S. C., writes as follows, in response to a request for his views regarding general conditions in that locality:

"We are operating to full capacity, without accumulating any goods at all, and it appears that this condition will certainly last for another six months. It is very hard to make a forecast of what will happen during the summer months, but if the information that has been furnished me is correct, in regard to depleted stocks of cotton cloth all over the country, I think it is safe to say that the cotton manufacturers will be given sufficient business to operate their machinery to capacity, even during the summer months.

"It is true cotton is higher, but when you take into consideration that there is possibly less than 25 pounds of cotton cloth used by each American citizen annually, the difference in price from 11½ to 14 cents only means about 62½ cents to each individual; and I do not think that so small an increase in price will lessen consumption. As a matter of fact, I doubt seriously if the retail price of cotton cloth will be advanced at all; and if the tariff board's report for 1912 is correct, there should not be any increase, for we are told by this tariff board that a fabric selling at the mill in the United States at 10½ cents would be jobbed at 12½ cents and sold to the consumer for 19 cents, or possibly 25 cents. The same fabric selling at the mill in England, at a price identical with that paid at the American mill would be jobbed at 11½ cents, and would reach the consumer at 15 cents."

Regarding the effects of the higher raw material costs, Mr. Welborn says: "I certainly think the cotton manufacturers of the United States have nothing to fear from 14-cent cotton, except it is more likely to have violent fluctuations when such a price is reached, and it is these violent fluctuations that always give the greatest concern.

"It also appears to me that the majority of the mills in the United States have nothing to fear from the reduction of tariff on cotton cloth, for the tariff has not been reduced to a point where there will be an unusual amount of cotton imported. Along this line, I think all manufacturers should forget the tariff bill as quickly as possible,

and devote their undivided attention to keeping up their efficiency.

"In our locality labor conditions are very satisfactory, and every one of the mills is running to capacity, with a sufficient supply of labor for all departments. We believe that next year will be a very prosperous one for all manufacturers that are operating in an efficient manner."

Announcement has been made that the Cox Cotton Mills, at Anderson, S. C., which was purchased under the hammer recently by Wellington, Sears & Company, of Boston, will be tripled in size and will manufacture duck. The old machinery is now being dismantled, making place for new machinery soon to arrive. The mill has been idle for more than a year. Robt. E. Ligon, a former president of the Cox Mill, will be local manager, and the name of the mill will be changed.

Jno. A. Shinn and associates are promoting a new cotton mill for Sylacauga, Ala.

The Wilson, (N. C.), Cotton Mills, are enlarging and improving their plant, having increased their capitalization from $25,000 to $40,000.

At Elba, Ala., J. M. Garrett, O. E. Ellis, F. P. Rainer and F. A. Symonds are planning the organization of a $100,000 company to build a cotton mill.

The Conestee Mills, at Greenville, S. C., have placed order for 2,000 additional spindles.

Much is being written and said about the giant cotton mill which is being promoted for Oklahoma City by W. B. Smith Whaley and associates, though no definite steps for the building of the mill have been taken, further than to secure funds with which to send Mr. Whaley to the Eastern markets for conference with machinery houses and commission people. The original company was chartered in November, 1911, as the Cotton Mills Security Company, with a capital of five million dollars. It is now proposed to build a 600,000 spindle mill, with ten million dollars capitalization. Of this, according to the plans, twenty-five per cent will be built and put in operation during the next year.

The Graniteville Manufacturing Company, at Graniteville, S. C., is planning substantial additions to the plant. A meeting of the stockholders has been called for November 26, to vote on increasing capital and providing for improvements. It is understood that the increase in capital stock will be from $600,000 to $1,000,000, which will provide funds necessary to double the capacity of their mill at Vaucluse, and add 700 looms to the Graniteville plant. These mills now operate about 57,000 spindles and 1,700 looms, and it is planned to increase this to 70,000 spindles, with necessary weaving equipment.

The Dunn Manufacturing Company, Gastonia, N. C., have placed an order for 3,000 additional spindles. This mill now operates 7,400 spindles, on combed yarns, 50's to 80's.

The Pickett Mills, at High Point, N. C., are planning a considerable increase in their plant. At present this company is operating 12,000 spindles on sheetings.

The Madaline Hosiery Mills, to be built at Ridgedale, will be equipped with 100 knitting machines, contract for this machinery having been placed. This is to be a branch plant of the Davis Hosiery Mills, of Chattanooga.

The Federal Cotton Company, of Memphis, have placed order for a lot of additional machinery.

The Panola Cotton Mills, Greenwood, S. C., have ordered a considerable amount of new machinery. They now operate 10,000 spindles on sheetings.

At a recent meeting of the stockholders of the Alice Mills, Easley, S. C., John M. Geer, of Greenville, was elected president of this mill, to succeed E. H. Shanklin, resigned.

NEW ENGLAND MILL SITUATION.

(Special Correspondence).

Cotton mills in New England are still running as they were a month ago, but the woolen mills are running hardly one-half of their equipment. This fact has done but little toward increasing the operatives desired in the cotton mills and it is as true now as it has been for months past that hardly more than 85 per cent of the cotton mill machinery is producing. The labor outlook has been further complicated by a demand for higher wages made formally to the Fall River Cotton Manufacturers' Association by the textile unions of that city, and by a threat of further troubles in some of the outside centers.

The declaration of special dividends of substantial size by three Fall River corporations, together with the generally favorable aspect of annual corporation returns at stockholders' meetings, provoked the demands of the unions. Manufacturers are not disposed to grant any wage increases but in the absence of official action it is unsafe to predict what may be done. The temper of workers is far from being stable or satisfactory, and in the event of a refusal to advance wages, such as is fully warranted by business conditions, there is a fear that a general strike may be provoked.

The mills at Fall River are generally busy on old orders and will keep in operation for the balance of the year if a strike does not intervene. Forward orders have been slow for the past three or four weeks, and spot sales have not fully taken care of the output. At the present time Fall River mills have less than a million pieces of all kinds of goods on hand, but the weekly sold to arrive list amounts to only about three-fifths of the possible output. In the absence of active spot sales, goods can accumulate steadily.

Bleacheries, print works and finishing works are running steadily. Their forward business has not accumulated much in the past month, yet in many instances they will continue to operate in full until the first of February if no additional business comes forward in the meantime. The hesitancy that has been noted in the placing of large orders for late delivery began after cotton declined about the first part of November. It was increased when money remained high and general business throughout the country began to show signs of a reaction. Although it is still true that many New England investors are pessimistic about the long future, there is reason for saying that in many important places there is a greater measure of healthy confidence than there was before cotton sagged.

It was announced during the month by Amory, Browne & Company, that all its lines of cotton blankets were withdrawn from sale for the balance of the winter season. This was due to the fact that there are no stocks in mill hands and the mills cannot complete their business unless a cessation of sales is enforced for a time. It was also announced that the great Nashua cotton blanket mills are to enter upon plans for another substantial increase in the producing machinery available for the new lines of cotton blankets of the woolnap grades. The details of the addi-

tions to equipment are not yet available. The Beacon blanket mills at New Bedford have also announced an increase in capital for the purpose of adding to the equipment for cotton blanket production. The Dartmouth mills of New Bedford have notified stockholders of a purpose to increase the common capital $800,000, making it $2,000,000 instead of $1,200,000, as at present.

Several mills have brought out new cloths for another season. The Bates mills are offering a new crepe 28 inches wide at 14 cents a yard in yarn dyed effects. The Androscoggin mills are offering a new plain cloth in piece dyed effects in imitation of crepon. It is produced on a dobby loom. The Barnaby Manufacturing Company has brought out three lines of fancy yarn dyed cloths in crepe and ratine suggestions to retail at 25 and 35 cents a yard. The Parkhill mills are offering many new lines of dress plaids, and the Nashawena mills are offering new lines of all silks. Many of the New Bedford mills are sampling on novelty cloths of various descriptions, including the new duvetyns. The American Printing Company is offering a new printed gingham at 5 cents a yard.

As a rule the yarn mills are more fully employed than the cloth mills, so far as new orders are concerned. Most of the new business is on specialty or novelty yarns. Less than the normal business is offered on staple weaving yarns, but in mills where special qualities are made for special purposes, business has been steady. The New England Cotton Yarn Company's mills are operating in full, and all the fine yarn mills at New Bedford are very busy.

The business on bleached cottons this fall has been exceptionally good. The staple bleached muslins sold under the best known brands have been bought more freely than for a long time, and orders are still in excess of the output. On the extreme fine grades of bleached cottons trade has not been as good as on the medium and low lines. Business continues good on sheets, pillow cases and pillow tubings, and especially good on embroidered and fancy effects in domestic bleached goods.

Staple printed goods and percales are being turned out in full volume by the printers. The orders for narrow staple prints have been sufficient to take care of the output to the end of the year, but new business has been very slow this month. Shirting percale for the manufacturing trade is offered for the new season at 9¼ cents on a basis of 80 squares, and is selling slowly at that price. Fine fancy prints in crepe, voile, poplin and novelty effects have sold more freely for advance delivery than fancy prints have sold in some years past. All the plisses, serpentine crepes and printed ratines that can be supplied before the first of February are under order. The staples of other years, such as batistes, lawns and organdies, are not wanted, save in a very small way.

The outlook on ginghams is spotty. Staple ginghams are well sold ahead. The dress ginghams that will retail under 12½ cents a yard are wanted, but the higher priced lines are not moving. Chambrays, shirting madras and fancy yarn dyed cloths that will retail at 12½ cents or under, are being shipped out as fast as they are produced.

One of the most important developments of the month was the announcement by Amory, Browne & Company, that they will hereafter sell aprons and rompers made from Lancaster staple ginghams at the plant of the Lancaster mills. It is proposed to make only standard goods of a staple character and to maintain standard sizes and qualities. As this is the first incursion of an old line mill and an old line commission house into the ready-to-wear business for the jobbing trade, it can be appreciated that the movement has attracted a great deal of attention.

The trend of mills to throw out narrow looms still continues an impressive feature of the New England industry. Mills that have hitherto depended largely upon orders for 32-inch fabrics or under have not been doing well for three or four years, and it is their intention to put in the wider looms steadily. Some few mills have even gone so far as to order 60-inch looms for dress cottons. The progress that has been made in this direction can be inferred from the fact that out of 40 printing machines now in the American Printing Company, 23 are for wide cloths and the balance narrow. Five years ago there were hardly five wide machines on the premises.

The mill machinery concerns are only moderately busy. The loom makers are doing a great deal of special work and the demand for automatic looms continues steady and full. Many repair and renewal orders are being placed quietly and some of the shops are not complaining, in view of the conditions of trade in other lines. More than the normal attention is being directed to power plants and to savings of many kinds.

At this time it is difficult to generalize upon the actual state of the business as a whole, because of the uncertainties that have crept in during the past two or three weeks. High cost cotton is certain to restrict production in some directions, and the mills are generally providing themselves with cotton for only a few months ahead. The uncertainties arising from tariff fears are still to be seen, and while there is a noteworthy attempt to minimize them and make the best of a situation that is not comfortable, other matters of greater moment enter into considerations of the future.

The decline in the steel trade, the decline in bank clearings and railroad earnings, fears of labor troubles, and maintained high money which affects the jobbers in their distribution of goods, are factors manufacturers and merchants are looking at. They concede the possibility that an advance in freight rates, the elimination of the Mexican uncertainty, the passage of a currency bill, and the natural easing in money rates after the turn of the year, can easily overcome all other uncertainties in the outlook, and with a fundamental of light stocks and light production, the trade can move ahead to new levels of prosperity, regardless of what the price of cotton may be.

COTTON CROP CONDITIONS AND A REVIEW OF THE MARKET.

(*Contributed Exclusively to* COTTON)

BY H. AND B. BEER, NEW ORLEANS.

After having sold at 14 cents for the second time this season, the market declined again to the 13 cent level. The decline was brought about by the issuance of several private crop estimates for a yield of 15,000,000 bales or more.

As a matter of fact the large crop estimates have been taken more seriously by the trade than the smaller estimates, and as a crop of 15,000,000 would provide all the cotton needed this season, there was general liquidation of long contracts and of spot cotton, which resulted in the decline established.

However, the size of this year's crop remains an unknown quantity still, as one day an estimate of 15,000,000 bales will be issued, only to be followed by a prediction for a yield of about 14,000,000 bales. There is nothing of an official nature on which one can look forward to for a yield of 15,000,000 bales. On the contrary, all the data available still points to a yield of less than 14,500,000 bales, perhaps not more than last year's 14,167,000 bales.

To November 14th of this year the quantity of cotton ginned was 10,434,000 bales compared with 10,300,000 to the corresponding date last year, an increase of only 134,000 bales over one year ago. In view of the high prices prevailing, it is probable that as large, if not a larger percentage of the crop was ginned to Nov. 14th this year than was ginned to the corresponding date one year ago. Under the circumstances there does not seem to be any warrant for crop estimates of over 14,500,000 bales.

In the meanwhile the trade will await the issuance of the annual crop estimate of the government, due December 12th, which will report on the probable size of the actual growth, exclusive of linters, etc. Last year the government made a good estimate, placing the growth at 13,820,000 bales. On the same date the Census will report on quantity gineed to Dec. 1st.

Thus far this year there has been marketed of this crop 7,319,000 bales compared with 7,157,000 bales to the corresponding date of one year ago, and although the movement to market shows an excess of 162,000 bales over last year's arrivals, the world's visible supply of American cotton is 592,000 bales less than it was at this time one year ago—4,076,000 vs. 4,668,000.

It is claimed that the trade demand is not good this season, still we find that the spinners of the world have taken to date of American cotton 457,000 bales more than to even date last year—4,298,000 bales vs. 3,841,000 bales.

The export movement continues large, since September 1st 3,868,000 against 3,836,000 one year ago, and we have reason to believe that shipments to foreign shores will continue heavy in the near future, as the stock on shipboard at all U. S. ports is very heavy, larger than at this time last season—343,000 vs. 329,000.

Private cables from Liverpool are to the effect that there is to be no short time in England this season, as spinners of Lancashire report good business for forward delivery. Liverpool's stock and afloat of all kinds is only 1,199,000 bales, last year 1,532,000, or 333,000 smaller than one year ago.

According to our deductions the United States will require more cotton than last season, Japan and Continental Europe about the same as one year ago, while England, owing to some falling off in the demand from India, will probably use a little less of American cotton this season. On the whole, however, it looks as if the world will need about 15,000,000 bales of American cotton this season, as last year's consumption by the world of American cotton was 14,903,000 bales.

Since the consumptive demand promises to be about 15,000,000 bales the size of the crop becomes the all important factor. If this crop should be less than 14,500,000 bales, as it promises to be, the market is apt to advance again to the previous high levels of the season.

English cotton mills sold to China 62 million yards of cloth during August, 1913, against 29 million yards in August, 1912.

THE YARN MARKET.

The yarn market for the past month has been rather a quiet one. The opening of the month found a rather spotty market, with the spinners holding prices very firmly. Those dealers who had unsold yarns to arrive, could quote prices slightly under the spinners' prices, and therefore did a fair volume of business. But even this came in small quantities generally and was kindly of draggy. The downward tendency in the raw cotton market served to check business, as many buyers wanted lower prices for deliveries, and spinners held for prices away above anything that the buyers would pay. Receipts from the South continued to be large, but there was no accumulation of stocks in the Philadelphia market. The yarn was going into the hands of manufacturers about as fast as it arrived. Some spinners who needed business made concessions of ¼ to ½-cent a pound, but these spinners were not in the majority. Combed yarns were rather quiet, with the demand confined to small quantities for quick deliveries. Fine two-ply yarns were weak, and Southern frame spun single-combed peeler cones were sold on the basis of 27 cents for 10's. Weaving lines were spotty generally, and carpets were very dull.

As the month wore on, while there were considerable inquiries for knitting yarns and while there were some sales made for future delivery, the yarn market as a whole continued rather dull. Some branches of the dyeing trade were active, while others were running only five days a week, but were not accumulating yarns in their warehouses, which was considered an indication that manufacturers were using yarns as fast as they were received. Orders on knitting yarns in large quantities, which were expected to arrive shortly after the prices on fleeced underwear were named, failed to materialize at the expected time. Negotiations were said to be still in progress on some special lots, with the buyer and seller trying to get together on the price question. Knitters were making efforts to break down the prices of spinners, as they looked for lower cotton later on. Spinners, on the other hand, stated that they had paid good prices for the cotton they owned, and kept the prices on the yarn in accordance with what the raw cotton had cost them. On weaving yarns, the market was practically at a standstill, as far as any forward business was concerned. Small spot lots were being bought from day to day, but the business was generally unsatisfactory.

As the month closes, a general falling off in the demand for yarns is noticeable. One dealer said that manufacturers had business to keep them pretty well employed until about the first of the year, and that they were well covered on yarns and did not care to take a chance at buying at the present prices in anticipation of needs. There is a general pessimistic feeling throughout the market, partly caused by the currency muddle in Washington, and partly because a slackness has been reported in the iron and steel trade, which are looked upon as a barometer of business conditions. Many of the large steel plants have laid off operatives and various rumors as to the cause indicate that tariff uncertainties have something to do with this, as well as currency problems. Also tight money is a large factor in the game. Many banks are not willing to advance money for new enterprises, and consequently the demand for structural iron and steel is falling off to such an extent that curtailment of production is necessary. Men's

wear manufacturers are running at their full capacity, dress goods are strong and other weaving lines are well employed, with the exception of damasks, which are dull.

Underwear is selling well, although some manufacturers consider the opening prices too low. The hosiery trade is generally good, but there are some bad spots. Some manufacturers complain about not getting duplicate orders, while others are sold up from four to six months. Combed yarns are quiet and the demand very light. There were three or four fair-sized sales during the past week of single-combed peeler, 16's to 22's for late delivery on the basis of 27½ cents for 10's Eastern yarns. Mercerized yarns continue very dull, and sales are limited to small quantities. English spinners have advanced the prices on mercerized yarns from 4 to 6 cents a pound. Sales of domestic 50's single-combed peeler mercerized were made at 76 cents. 60's singles at 86 cents. Sales of 80's two-ply combed Sea Island on cones figure at 69 cents. 60's two-ply combed peeler sold for 52 and 54 cents. The uncertainties in the raw cotton market at the present time have a great deal to do with the holding up of business in the buying of yarns. Many manufacturers are looking forward to a fairly large crop and are therefore holding off on the chance of lower prices. Other manufacturers are equally certain that the crop is a small one, and are correspondingly bullish. A few more weeks of this uncertainty, and then the cotton crop will be a simple factor, and at least one source of worry will be removed from the shoulders of the purchasing agent.

The following are recent quotations from the Philadelphia market:

Southern Single Skeins.

4s to 8s	20½@21	10s	21 @21½
12s	22	14s	22½
16s	23 @23½	20s	24½
26s	26	30s	27½

Southern Two Ply Skeins.

8s	19½@20½	10s	21 @21½
12s	22	14s	22½@23
16s	22 @22½	20s	24½
24s	25½@26	26s	26 @26½
30s	27½	40s	33 @34
50s	38 @38½	60s	48 @49

Carpet and Upholstery Yarns in Skeins.

9-4 slack	21½	8-4 slack	21½
8-3-4 Hard Twist	19½@20		

Southern Single Warps.

8s	21½	10s	22 @22½
12s	22½	14s	22½@23
16s	23½	20s	24½
24s	26	26s	26½
30s	27½	40s	33

Southern Two-Ply Warps.

8s	21½	10s	22
12s	22½	14s	23 @23½
16s	23½@24	20s	24½@25
24s	26	26s	26½
30s	27½@28	40s	33½@34
50s	39 @40		

Northern Two-Ply Carded Peeler Skeins.

20s	26	22s	26½
24s	27	26s	27½@28
30s	28½@29	36s	33½
40s	34 @34½	50s	38 @39
60s	49		

Two-Ply Combed Peeler Skeins.

20s	31	24s	32 @32½
30s	35½@37	40s	41 @42
50s	47 @49	60s	52 @53
70s	58 @60	80s	68 @70

Single Combed Peeler Skeins

20s	30½@31	24s	33
30s	35½@36	40s	41 @41½
50s	46½@47	60s	53 @55

Southern Frame Spun Yarn on Cones.

8s	21½	10s	22
12s	22½	14s	23
16s	23½	18s	24
20s	24½	22s	25
24s	25½@26	26s	26 @26½
30s	28 @28½		

Taking it for granted that the employee is industrious and loyal to the company. These are good traits, but they do not spell efficiency. He must use his brains and accomplish a definite result, along a definite line and the result must be, right and the one desired.

THE KNIT GOODS MARKET.

The knit goods market continues fairly strong with the mills well employed and with the exception of an occasional spot, looks fairly good for some time to come. As the month opened a few manufacturers had fixed the selling price of next season's heavy weight underwear, and these prices were attracting some attention. One manufacturer made his opening price the same as his closing price of last season or, in other words, he was asking $3.62½ for eight-pound women's underwear which retails at 50 cents a garment. It is expected that others will follow this example and open at about the same price as they closed. The situation in cotton made the price problem more complex than usual, and though a number of quotations could be heard, the exact condition of the market was practically impossible to obtain. A well-known men's ribbed shirt of a Northern mill that was considered low-priced last year, is understood to be 25 cents a dozen higher for next fall, meaning an advance of little over 7 per cent, but keeping well within the jobbers' limit. Two lines of boys' fleeced union suits were priced at $2.85 for 24's. In women's goods, the cotton lines were at 12½ cents to 25 cents a dozen over last year.

By the middle of the month, it was reported that underwear salesmen were doing well and that the heavy weight season had opened favorably. The union suit end of the business furnished its usual quota of interesting features. A sixteen-pound garment of Southern make was said to be priced at $6.75 a dozen, a price which was regarded as highly attractive. Competing suits of Northern mills were reported priced at $7.00 a dozen, meaning an advance of 25 cents over the opening of last year. A new 14-pound suit of spring needle construction which has been opened for business of next fall, has made an impression, not only among buyers, but also among competing mills. It is understood, however, that this suit is sold under special conditions, being offered for $7.00, in connection with other garments made by the same mills.

New reports for the advance business in the underwear trade for next fall were uniformly encouraging, but it was evident that many mills were concerned over the profit outlook under this season's conditions. Salesmen for important lines of cotton hosiery, both fleeces and plain, were out, and taking business for next fall, though not generally supposed to be open. Prices, as far as could be learned, show advances, of course, but not radical, as the increased price in cotton would indicate. It was reported that boy's and other fleeces are up about 5 cents a dozen over the opening prices of the same weight of a year ago. As in cotton underwear, the hosiery mills and agents in naming prices, have had to consider established conditions in the trade, particularly the fixed price with the limitations that the jobber claims his condition imposes upon him in merchandizing. Some goods formerly weighing 2 pounds 8 ounces, are reported to have been reduced to 2 pounds 4 ounces, with the price almost the same as last year. One of the new features recently put on the market by Hinchman, Vezin & Company, the selling agents, were hosiery samples of a new construction, which is said to allow for perfect fit for foot and ankle without stretching or wrinkling, and which is known as the "Hirner Fashioned Foot." This fashioned foot is gained through an extension of the material from the heel by a patented mechanical device, and the new foot is so attached that the entire foot

below the top of a low shoe can be made of white yarn for those who prefer that style. Patents have been applied for in the United States and foreign countries, and the selling agents who were pioneers in marketing the seamless stocking are most enthusiastic about this new design and report great interest from the buying trade who have seen the samples.

As the month closes, it leaves underwear selling well and the hosiery trade generally good, but the stringent money situation is a factor which is being felt in many quarters. One large hosiery manufacturer said he had gilt-edged investments that were paying over 6 per cent and could now be bought at 20 per cent below par. No one seems to want to invest in securities, but prefers to hold onto the cash. However, business continues good, not only in this man's mill, but in many others in the hosiery trade, and while money is scarce, orders are plentiful. It is probable that if the administration had been contented with passing the tariff bill at the extra session and then adjoined to the regular session before attempting the currency discussion, it would have eased general business conditions to a large extent. Unfortunately, however, they did not see fit to do this, and we now have the complication of a currency fight in combination with the holiday season and the first of the year inventories, which will all tend to slow up business until after the first of January.

COTTON MANUFACTURING.

HOW TO OVERCOME THE UNEQUAL CONDITIONS ON FLY FRAMES.

(*Contributed Exclusively to* COTTON)

BY WILLIAM SHAW.

In my articles on "Defective Yarn and Roving," and "Making Yarn Strong and Uniform," which appeared in COTTON for February and May, 1913, I think I proved the fly frame the most important machine in cotton manufacturing.

We can arrange every machine preceding and proceeding the fly frame so as to obtain a uniform draft, but on fly frames we are helpless.

This may be accepted as only one man's opinion, but if the reader is a bit skeptical on the point, let him write any builder of fly frames and ask if it is possible to construct and modify cones so that the outlines or intermediate speeds will suit all hank rovings, stocks, different speeds, etc., and every builder will answer that it is an impossibility.

We can, of course, arrange the drawing rolls so as to obtain the same uniform draft, but this uniformity is destroyed on every stand when the winding-on takes place.

My object in writing this article is to try and point out how to overcome the unequal conditions that take place during the winding of the roving on the bobbin.

I need not, perhaps, point out here, that the longest and strongest staple of cotton will make the most uniform yarn, but why is this so? With the best of stock, we experience the most trouble in the carding and combing, but on fly frames the work runs from set to set. On the other hand, with poor stock, no trouble whatever is found in the processes preceding the fly frames, but here we get the bulk of the trouble.

The writer has given this question much study, and has arrived at the following conclusions: (1) that owing to the best of stock being wiry, it offers a certain amount of resistance to the wire and drawing rolls in the processes preceding the fly frames; (2) that owing to the best of stock being longer and wiry, the influence of air currents on the presser rods, the speed and the poor condition of the flyers is overcome by the strength of the strand. With poor stock these conditions are reversed.

In order to clarify this statement let us consider the causes of defective flyers. As a rule, very few mill men consider the importance of well constructed balanced flyers. The flyer found in fly frames is a much more ingenious contrivance than is suspected by many mill men, and I would ask flyer fixers also to please notice.

Flyers found on up-to-date fly frames are constructed on just one principle, which is to attach the presser rod to the hollow leg of the flyer as snugly as possible and at the same time give the presser rod due freedom to fly outwards and respond to the speed of the spindle and flyer.

It is a practice in most mills to buy the presser rods only, and have them attached to the hollow leg of the flyer by the second hand or fixer. This is done of course to save expense, but I think the following explanation of the above practice will change the minds of many manufacturers.

In order to have well-balanced flyers and obtain bobbins of the same compactness, the presser rod must be attached to the flyer snugly and with freedom to swing and respond to the speed of the flyer. Now, how many persons in charge of attaching the presser rod to the flyer understand the function of the presser rod from the beginning to the ending of the set? Mr. Reader, if you are in charge of a cotton mill and allowing this practice to go on in the mill of which you have charge, after reading this article question the persons in charge of such work, and you will perhaps be surprised to find how little some of them know about the functions of the presser rod.

The majority of carders feel the compactness of the roving when passing a full box on the floor. If they find a few soft bobbins they insert a little more twist, and if the bobbins are found to be hard, a little twist is taken out. Little if any consideration is given to the condition of the flyers. Of course, there are some carders that do but they are in the minority, because many do not take the time to study the question.

The writer is willing to admit that the lack of twist will make soft bobbins, still, it is also admitted by our best carders, that a great many soft bobbins contain too much twist, and the real trouble in such cases was found to be in poorly repaired or unbalanced flyers, hence hard ends in the proceeding process.

Let us reason out how a presser rod poorly adjusted to the hollow leg of the flyer will cause the end to snap many times and then let us reason out what will cause the end to run slack. Let us assume in this case, that the person in charge of attaching the presser rod to the flyers has little knowledge of the function of the presser rod. In such a case, when the presser rod is attached, the safety of the presser rod severing itself from the hollow leg is considered only.

Now, if the presser rod is not free to swing and respond to the speed of the flyer, the pressure of the presser finger on the surface of the bobbin is completely destroyed, and the coils are not wound as close to one another as on all other bobbins where the presser rod is allowed to swing and respond to the speed of the flyer, consequently the diameter of the bobbin in question will increase more rapidly and cause the end to snap continually.

Such a case is quickly discovered. But what gives the most trouble and what has always given a great deal of trouble on fly frames, is when the snugness of the presser rod offers only a slight resistance. In such a case, the diameter of the bobbin increases slightly and just enough to snap the end every little while, and of course, each time the end breaks, a certain amount of roving is lost, which aids in concealing this defective flyer, for the reason that it will run a few layers before it snaps again, and this leads the tender astray and the evil is allowed to continue.

At this point, I would like to have the reader stop and think how different the case would be using good long wiry stock.

Examine the presser finger of your flyer on the spindle, and it will be found that the eye of the pad does not come opposite the center of the bobbin. The eye is nearer the center of the bobbin when the bobbin is empty. However, if the distance from the end of the palm to the horizontal part of the presser where the strand is wrapped be measured, it will be found greater than the length of any staple used in any print cloth mill. From this it may be seen that although a slight resistance to the swing of the presser rod will affect the diameter of the bobbin, the trouble is not so great in the case of long wiry stock, for the reason that the strength of the staple and also its length (longer than the distance from the end of the palm to the first wrapping of the strand near the eye) is enough to hold the pad on the surface of the bobbin, and in most cases, strong enough to hold the relationship of the surface speed of the front roll and bobbin equal.

The resistance offered the presser rod is not the only defect that will cause the work to run badly on fly frames, as the position of the presser rod on the hollow leg will also destroy the relationship of the surface speed of the front roll and bobbin. If the presser rod is positioned too much at the rear of the hollow leg at the beginning of the set, the influence of air currents has not the same effect upon the presser rod, and the pressure of the pad on the surface of the bobbin is increased which reduces the diameter of the bobbin and causes the end to run slack.

The latter case is only troublesome and does not injure the strand, however, it does bother the tender, for the reason that this bobbin must be broken back or removed and matched by another bobbin taken from the creel proceeding this process having a diameter the same as all other bobbins.

The unequal conditions found on all fly frames is more noticable in the case of fluffy cotton, for the reason that the pressure of the paddle, even when free to swing, is not great enough to condense the strand and reduce the diameter of the bobbin to hold the relationship of the surface of the front roll and bobbin. The bobbins which contain the most fluffy cotton or waste offer the most resistance to the pressure of the paddle, and the diameter of the bobbin increases in spite of the flyer being perfect and the presser rod free to swing. This is a strong point against allowing the stock to be fed one bale at a time to the bale breaker as is the custom in some mills, instead of mixing the stock in large mixings and allowing it to stand for a few days.

What seems to be most misunderstood regarding the unequal conditions found on fly frames, is that the stock which causes the most trouble is the weakest. As stated, the least resistance offered to the swing of the presser rod will affect the diameter of the bobbin, and if the stock be fluffy the diameter of the bobbin will increase and force the paddle away from the bobbin and cause the end to snap.

What have we done about it? Simply nothing, because builders of fly frames themselves confess that it is impossible to overcome this trouble.

In the case of fluffy cotton, bobbins of different diameters can always be found running on the same frame. In some cases the diameter of the bobbins containing too much fluffy cotton or waste will increase to such an extent as to necessitate a layer or two being pulled off to prevent them from rubbing in the creel.

When a poor mixing of cotton is run through a mill, conditions will, in a short time, become deplorable on all the fly frames, and the trouble is the snapping of ends. Most carders understand this, but nothing is done, because they know the trouble is in the stock. If the superintendent finds fault with the poor production turned off, the carder defends himself by pointing out the nature of the stock he is using, and the matter ends. When the work runs badly on fly frames the number of piecings is of course increased, which, together with the poor stock, also makes the spinning run badly.

From what I have already shown, it must be evident that the bulk of the trouble exists in the space between the end of the palm and a point on the horizontal part of the presser where the strand is wrapped. Therefore, in order to overcome the unequal conditions found on fly frames, the strand must be made stronger at this point, and the only way this can be done is by inserting more turns to the inch in the strand. I have made many tests, and found this the only remedy for the unequal conditions on fly frames pointed out in my former articles.

The trouble with most of us is, that we hold too much to the old rules and methods handed us by our fore-fathers. For instance, in setting the drawing rolls in former days, the practice was to set the rolls as close as possible and have the distance between the centers of each pair of the forward rolls slightly exceed the average length of the staple. But we know better now, and we know that by such a close setting many fibers are broken, and that if the fibers are strong enough, the front roll is checked at intervals and we have the production of cockled yarn.

We know at the present time, that in addition to the length of staple being run, there are several other principles that should be considered.

Rapidly revolving rolls require wider settings than those having slow speed, since with a slow speed the rolls could be set closer together and still the fibers would be given a sufficient length of time to be drawn away from the mass of cotton without being strained. The greater number of fibers in the cross section of the strand require wider settings and for the same reason stated above. When the roving fed in at the back is heavily twisted, the settings are wider than when the end is slightly twisted. This is due to the fact that it is more difficult to draw the fibres past each other in the former case than in the latter.

There is one hard and fast rule handed down by our fore-fathers that few have rejected at the present time, and that is, to have only enough twist in the strand of roving to unwind at the next process without breaking. I long

ago rejected this because I found from experience that it was wrong both in theory and practice, in the case of short stock.

I think I have proven that more twist should be inserted in any strand which is composed of fibers having an average length shorter than the distance from the end of the palm to a point on the horizontal presser where the strand is wrapped, this is the only means to overcome, to a large degree, the unequal conditions found on all fly frames. In the second place, we know that as the bobbin fills, the eye of the pad lies more fully on the surface of the bobbin. This can best be proven by examining the position of the eye of the pad when the bobbin is empty and when it is full.

Again, owing to the diameter of the bobbin being larger when filled, any slight retardation of the flyer will cause a great amount of stretch. The bobbin-lead is the type of fly frame found most in use at the present time, and as the bobbin leads the flyer at all times, it should be clear, that any retardation of the flyer will cause a certain amount of stretch.

There are a few speeders found that have run a number of years in which the pin in the boss of the flyer is not worn considerably, in some cases more than in others. However, no matter how slight, if the strand is weak from a lack of twist, a little stretch takes place at this point. Speeders running short stock run badly when the set is nearly filled as a rule, and this is the cause.

At the beginning of a set of roving the pad practically coincides with the radius of the circle made by the flyer legs, and this concurment decreases as the bobbin fills.

On all fly frames that have been in operation a few years, a certain amount of play can be found in the slot of the spindle due to the pin in the flyer boss having become worn. Because of this old fly frames do not run as well as new ones, especially when the set becomes almost full. What is the reason?

Examine the spindles and flyers on one of your fly frames at the beginning of the set and make the following test on one spindle. Move the flyer back and forth and mark on the bobbin where the end of the pad reaches in each case, and then measure the distance. The distance will be found to be small. Next, when the set is full, make the same test, and you will find that the distance on the full bobbin will be a surprise.

On old frames, it is common to find a play in the flyers that allows the pad to move nearly an inch on the surface of the full bobbin when moved back and forth. This is why the ends snap more as the set becomes full.

It should be borne in mind, that on all bobbin-lead frames, the bobbin speed exceeds that of the flyer at all times, so from what has been said it can be seen that the play, pointed out above, results in stretched roving every time the frame is started.

If manufacturers would buy an extra set of flyers and have the flyers newly pinned one frame at a time, they would be surprised at the result. The frames would not only run much better, but the stretched work which proves so detrimental to the production of an even thread would be remedied to a certain degree.

I could count on one hand the mills in the United States that oil the top of the spindles, for the reason that the spindle and flyer revolve as one. But it should be borne in mind that flyers are pulled from the spindles at each doff. So if a frame doffs three times a day in ten years we have, with 311 working days, $311 \times 10 = 3{,}110 \times 3 = 9330$ times the flyers are removed from the spindles. No wonder then the pins in the flyers become worn. Spindle tops should be oiled on every Monday morning when all the flyers should be removed.

In the third place, by making the strand stronger at the point stated, the paddle is made to hug the surface of the bobbin more closely, and in case of fluffy cotton or waste, the twist in the strand aids in condensing itself and the same conditions as that of long stock is attained to a certain degree.

In the fourth place, by inserting more twist in the strand and not changing the rack or tension gear a continued slack tension will be had throughout the set, for the reason that the strength of the strand is greater than the resistance of the surface of the bobbin offered to the paddle in the case of fluffy cotton or waste. When a speeder is made to run under the above conditions make the test I pointed out in my article of May, 1913, which is, to stop a frame, and then lift a bobbin gear slightly and turn it about one-half turn towards the presser finger, and then start the frame again, and it will be found in this case that the slack will not be taken up immediately.

This subject is a serious one, or at least it is so regarded by the writer, because if any stretch takes place between the surface of the bobbin and the front roll, the light places are greater in length than any light places caused by the drawing rolls. Therefore, is it not much better to sacrifice the setting of the drawing rolls in order to remedy the unequal conditions found on the fly frames?

I feel sure that some mill men will reject my views on this subject, but before this is done, please try and find the cause of the light sizing mentioned in the May, 1913, article on page 280. There we had a variation of three numbers, and if any other cause was responsible other than I have pointed out, I would appreciate having the same explained, not only for my benefit, but also for the benefit of the readers of COTTON. I would also like to have pointed out what takes place between the surface of every bobbin and the front roll while the slack is being taken up immediately on the slack end. There is only one answer, which is that a certain amount of stretch takes place and is the cause of weak yarn.

The following table gives the constants that are commonly used for American, Egyptian and sea-island cotton on the slubber, first intermediate, second intermediate, and fine frames.

Cotton	Slubber	First Inter.	Second Inter.	Fine
American	1.0	1.1	1.20	1.3
Egyptian	.9	1.0	1.10	1.2
Sea-island	.7	.8	.90 to .95	1.0

The following table is used by the writer to overcome the unequal conditions found on all fly frames:

Cotton	Slubber	First Inter.	Second Inter.	Fine
American	1.1	1.2	1.30	1.50
Egyptian	.9	1.0	1.10	1.2
Sea-island	.7	.8	.90 to .95	1.0

It must be understood that the amount of twist inserted in the roving varies according to the hank being produced and the stock being used. The constant given in the tables should be multiplied by the square root of the hank roving run. When the second table is used, the drawing rolls must have a wider setting, as a rule, from 1/16 to 1/8 of an inch wider than the settings for the constants given in the first table.

This second table has proven very valuable to the writer, not only in aiding the unequal conditions described, but also in eliminating entirely the trouble known as breaking back.

Another point is that the roving will break back more in the summer months, and to such an extent in some cases as to cause petty strikes.

I will admit that when a strand fed in at the back of either fly frame or spinning frame contains an extra amount of twist, that the fibres in the twisted strand will offer more resistance to the top rolls in being drawn past one another. But is it not better to put a little extra work on the drawing rolls, and make the conditions on the fly frames more equal? The above can be tested and it is at least worth a trial. Try it on a few machines first, and then if the results are found as I claim, put the whole room in the same condition.

A wide roller saddle will cause more friction on any top roll than a narrow one.

It is surprising when tried, how the least pressure of the thumb on any top front leather roll will affect the tension of the strand. Try it! So when any extra twist is inserted in the strand fed at the back of any machine, the frictional contact of the top leather front roll and the bottom steel roll is increased.

When the writer adopted the second table given, this question was considered and to overcome the extra friction the saddles were made narrower.

By referring to Fig. 1 it can be seen that a very small portion of the saddle is on the surface of the roll, owing to each side of the bearing point of the saddle having an angular position relatively to the surface of the neck of the roll. Thus, aided by the saddle being made as narrow as possible, a great deal of friction is eliminated. It can be seen that very little resistance is offered to the top roll when using such a saddle.

Figure 2 shows a worn saddle that will increase the

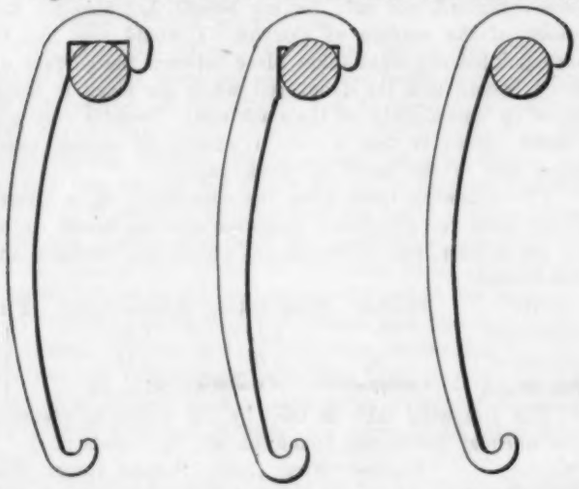


FIG. 1. FIG. 2. FIG. 3.

frictional contact of the top leather roll, especially in case of wiry cotton or a heavily twisted strand fed in at the back. When a saddle is worn as shown in Fig. 2, it should be taken out and filed.

Fig. 3 shows a saddle that is very much used, and which causes a greater amount of friction than the worn saddle shown in Fig. 2. The saddle shown in Fig. 3 will be found on some of the latest fly frames turned out. I believe this to be a mistake.

One must stop and think what friction is, to have an idea of how much it will affect a strand of cotton. If pressing the thumb slightly on a front roll will greatly affect the tension of any strand on fly frames. The reader can, by testing, form an idea of the amount of evil the saddles in Figs. 2 and 3 will cause.

Friction means the resistance offered the top roll to cause it to lag, and if the resistance offered is steady, the strand will be even, but heavy; but it is seldom that any friction is steady, and instead it is an unequal intermittent action on the top roll that makes the strand uneven in places. However, it will be found that the friction caused by extra twist in the strand will be more steady than from using a worn or wrong kind of saddle. The conditions in any print cloth mill could be improved wonderfully by using the constants in the second table and by the use of ball-bearing rolls.

Unequal conditions found on fly frames can also be remedied by keeping all parts clean. In the summer months the tension on the ends is much slacker, and we are told that the warm weather is the cause, but how does the weather affect the tension? Some will also point out that having the cone belt near a window will affect the running of the frame. Metal will contract and expand in different temperatures. So, if we allow the bolsters to become clogged with dirt, when the bolsters and spindles expand in the summer months a great amount of resistance is offered to the carriage making its downward traverse, and in turn the same resistance is offered the bottom cone and its connections, which increases the slippage of the cone belt, and we have a slack tension.

In some mills we find that pulleys supporting the chain and weight that balance the carriage are clogged with dirt, not having been oiled for weeks; also the slides in the same condition. A great many carders would look amazed if it was pointed out that any resistance offered to the carriage and its parts would cause a slack tension.

When bolsters are filled with dirt and the pulleys and slides in the condition described, it causes the carriage to jump and also causes a dwell at the end of every traverse, thus carrying unnecessary strain on the cone belt, which also makes conditions on the fly frames unequal.

The good working of the bottom cone depends upon a small piece of belting; that is, the cone belt, and it should be the aim of all persons having charge of speeders to remove all unnecessary strain from this belt. In order to do this, the spindles should be pulled out at least once a year, and the bolsters scraped and cleaned by forcing a small piece of waste through each bolster. The slide pulleys and all slow-moving parts should be oiled with heavy oil at least once a month. That the above parts are sadly neglected in most mills is proven by finding most slide pulleys at a standstill while the frame is in operation. Notice this when passing the back of a fly frame, and in most cases, at least one or two will be found stopped. I need not point out here that one dry pulley or slide is enough to cause slack tension.

I will now give another example of how the roving is strained on fly frames. I think I have proven in my two former articles that a strand of roving will stand a great amount of stretching before breaking. With the above in mind, imagine a speeder to have clogged pulleys, due to not having been oiled and cleaned, and also dry slides. Think of the unnecessary strain upon the cone belt, thus causing friction enough to retard the bottom cone and bobbins, and destroying the relationship of the surface speed of the front roll and bobbin, and causing the

tension to become slack. Again, imagine the rack gear to be changed to increase the tension. This change will tighten the ends and the rail jumping slightly from the want of cleaning and oiling, will make the tension irregular, causing the ends to be continually snapping at the eye of the presser, making conditions the same as when the flyers are defective. If the pulleys and slides of this frame are carefully cleaned and oiled, the necessary strain will be at once removed and the bottom cone will obtain its proper speed, and as the rack gear was changed to accommodate this unnecessary friction upon the bottom cone, the ends will be strained, and the amount of strained work made depends, in such cases, upon the good judgment of the tender.

Once, in taking charge of a card room, I inquired of the oiler how often he oiled the lifter shafts and slides. He answered that he had nothing to do with the elevator. When I explained to him that I meant the slow-moving parts on the speeders, he confessed that he had never oiled them, and he was on the job seven months.

If any reader should make the tests I have pointed out in this article, I hope he will judge the test by the uniformity of the yarn, and not by the strength, because the speed of ring spindles vary to such an extent as to affect the strength of the yarn.

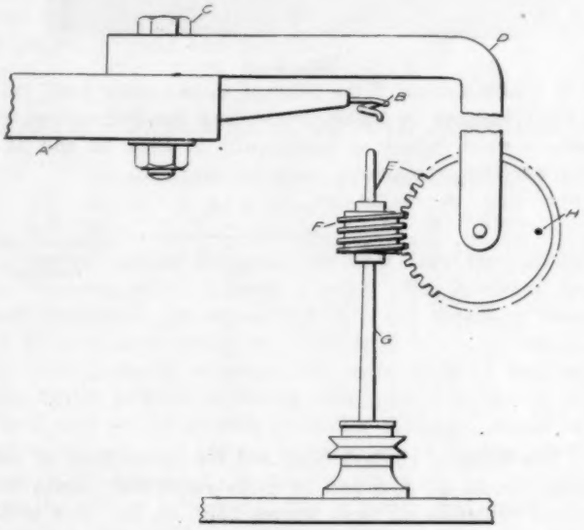


FIG 4

The elements of power consumption are the same on all types of spindles, but their proportion varies to such an extent with different forms that it is necessary to determine the absolute influence of each type separately. The accompanying illustration, Fig. 4, shows the writer's own device for obtaining the actual speed of the spindle.

This consists of a brass angle D. The part which attaches to the frame is six inches long, while the part extending downward is seven inches long. The thread board is shown at A. The guide wire at B. The arrangement for fastening the angle to the thread board at C. The small spur gear E' contains 100 teeth of the proper pitch to mesh with the single pitch worm F, which is forced on the spindle G. A little wire protrudes from a tooth of gear E in such a manner as not to interfere with the meshing of the worm and gear. With this device 100 revolutions of the spindle will give one revolution of the gear.

It should be remembered that even when a proper device is used to obtain the actual speed of the spindle, the twist per inch must not be calculated by the speed of the spindle, but by the speed of the traveler.

When one strand of 28's yarn breaks at 61 pounds, and the other having the same exact weight breaks at 45, there is something wrong with the speed of the spindle.

This description is given to use in connection with the tests I have pointed out. Before closing, I wish to state that the pressure of the presser paddle is greater upon the empty bobbin than it is upon a full one, a feature that occurs in all types of flyers.

DESIGNS FOR FANCY COTTON FABRICS.

(*Contributed Exclusively to* COTTON)

BY THOMAS WOODHOUSE AND JAMES IRELAND.

PART FIVE.

Three pretty little stripe patterns are shown in Fig. 22, the colors are indigo and white; dark blue, pale green and

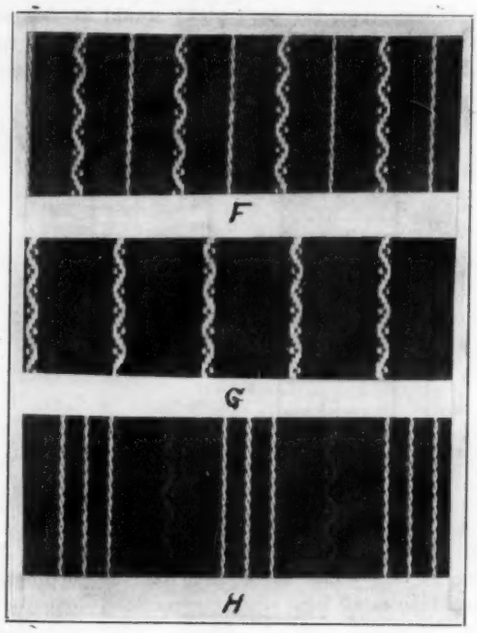


FIG. 22.

white; and dark blue, orange and white. The warping particulars for all are as follows:

Pattern F.

Indigo blue	15	30	15		= 60
White		8	3		= 11
					—
Threads in each repeat					71

Pattern G.

Dark blue	8	15	15	7	= 45
Light green	3		3		= 6
White		8			= 8
					—
Threads in each repeat					59

Pattern H.

Dark blue	15	30	15	15	15	= 90
Orange	8					= 8
White		3	3	3		= 9
						—
Threads in each repeat						107

The weft in each case is the same color as the warp threads in the groundwork of the pattern.

Little need be said about the construction of these cloths except with regard to the wave like stripes; the weave in all the other stripes, as well as that in the ground parts, is the usual 5-thread sateen. Each of the stripes forming the wave effect is composed of threads, which are operated in double warp order, *i. e.*, two threads weave together as one. The unit weave of this stripe is illustrated at J, Fig. 23, the draft of the harness at K, and the weaving plan at L. 16 picks of filling and 4 harnesses are required for the unit, and 5 picks of filling and 5 harnesses for each unit of the sateen portion. Hence, 9 harnesses in all are necessary, and since 80 is the L. C. M. of 16 and 5, it follows that, when the two weaves are combined, the complete weaving plan will occupy 80 picks. As already indicated, such patterns may be produced by employing two barrels or cylinders. In the case under notice, one weave is complete on 16 picks and the other on 5 picks. If the dobby is one of double lift, each lag will serve for two picks, and if the cylinder is 8-sided, the minimum number of picks in one round of the cylinder will be 16; consequently, 8 lags (two for each pick) would be pegged for the wave stripe weave, and 10 lags or 20 picks (4 repeats of the 5-thread weave) would be necessary for the ground

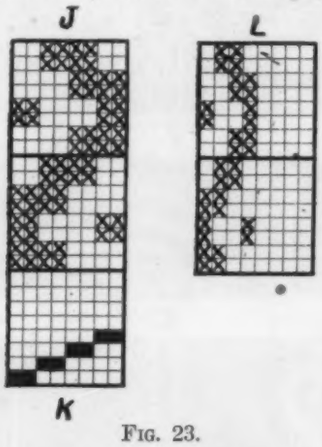


FIG. 23.

weave. In an ordinary single cylinder, double lift, dobby machine, 40 lags would be required for the 80 picks, while in many dobbies 80 lags would be essential—one for every pick in the round.

The two patterns shown at M and N, Fig. 24, can be reproduced with the same weaving plan or plans, single or double cylinder, as is or are used for those patterns in Fig. 22. It is, of course, understood that the necessary

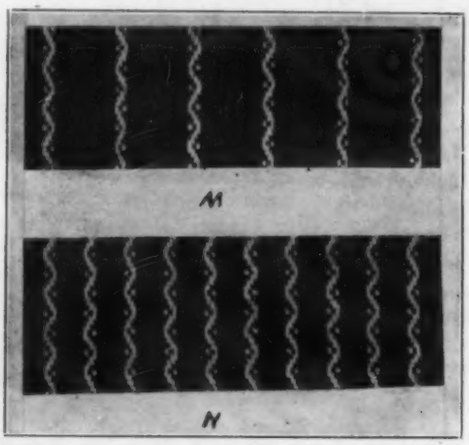


FIG. 24.

alterations in the drafts would be essential. Further reference would simply be a repetition of what has already been said. The chief reason for the introduction of Fig. 24 is to illustrate effects produced by the same units in different proportions. Pattern M has 45 threads of dark blue between the wave-like stripes of 8 threads, while between the similar white stripes in pattern N there are only 20 dark blue threads.

Three distinct weave effects are embodied in each of the patterns reproduced photographically in Fig. 25. Pattern

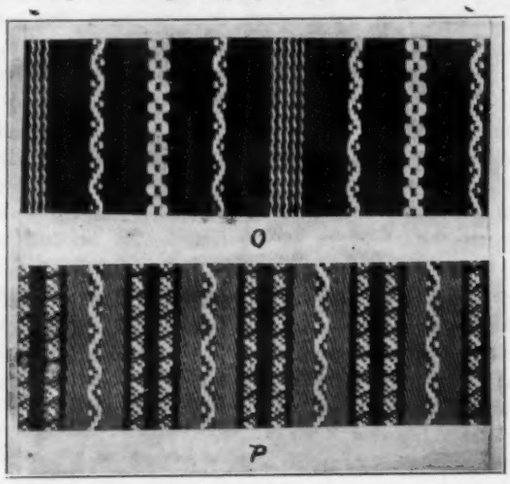
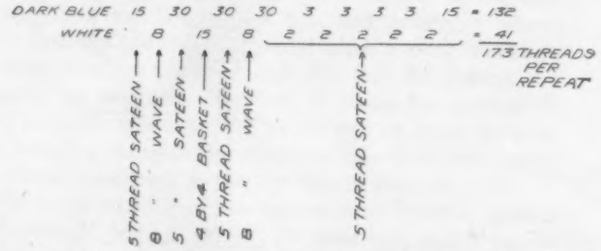


FIG. 25.

O is a combination of the 5-thread sateen, warp flush, the 4 by 4 hapsack or basket weave, and the 8-thread wave pattern which figures so prominently in Figs. 22 and 24. The warping arrangement is as follows:


DARK BLUE 15 30 30 30 3 3 3 3 15 = 132
WHITE 8 15 8 2 2 2 2 2 = 41
173 THREADS PER REPEAT
5 THREAD SATEEN
WAVE
SATEEN
4 BY 4 BASKET
5 THREAD SATEEN
WAVE
5 THREAD SATEEN

The filling is all dark blue, and the combination of the three weaves on 5, 8 and 16 picks respectively again requires 80 before all three weaves finish on the same pick. Although the introduction of the basket weave does not increase the number of lags required for practical purposes, it increases the number of harnesses by two, that is, eleven harnesses are necessary for the weaving of this pattern, 5 for the sateen weave, 4 for the wave stripe, and 2 for the basket. This pattern could also be woven by a double cylinder dobby by pegging the basket weave on the same lags as the wave weave, two repeats of the basket to one repeat of the wave since they are complete on 8 and 16 picks respectively. Six harnesses would thus be operated from one cylinder, and five harnesses from the other cylinder.

Pattern P is composed of three colors of warp, dark blue, light blue, and white, and the filling is dark blue. The order of warping follows:

Dark blue	5	5			5	5	=	20
Light blue			15	15			=	30
White		8		8		8	=	24
Threads per repeat								74

All dark blue and light blue threads interlace with the weft in 5-thread sateen order. The wave pattern is the same as that in pattern O. The two fancy white stripes on the dark blue ground occupy 8 threads each, and are woven by a 4 harness 8 picks to the round weave, the unit of which is shown at Q, Fig. 26. It will be seen that these threads work in pairs, therefore 4 harnesses are sufficient for the 8 threads which are drawn through the mails of the

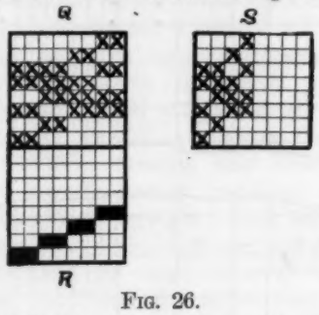


FIG. 26.

harnesses as indicated at R, unless, as is often the case, two threads are drawn through one eye of each mail. In both cases the weaving plan would be as shown at S, and 80 picks will again be necessary for the three different weaves on 5, 16, and 8 picks. The minimum number of harnesses is 13, say 1, 2, 3, 4 and 5 for the sateen weave; 6, 7, 8 and 9 for the two white stripes on the blue ground; and 10, 11, 12, and 13 for the wave design developed in white on the light blue ground.

(To Be Continued.)

CLOTH ROOM METHODS AND MACHINES.

(Contributed Exclusively to COTTON*).*

BY C. T. FALLIN.

We will assume the goods are now ready for packing for shipment, either in cases or bales. This is one of the most important jobs around the mill, and should be done by an exteremely careful and competent man. To handle the work properly, we must have some form of packing slip, neatly printed on strong, thin paper, as shown in Fig. 2, and put up in pads or blocks. This slip should be cut to fit into the adding machine, as no modern cloth room in this day will try to run without an adding machine, even the smaller mills would find it money well spent. A word just here about the proper machine to use. The best machine to use has a separate column for the fractions, ¼, ½ and ¾, and also will list up to 999,999, in integral numbers. Such a machine is more convenient and cheaper than the machine with decimals, which is commonly used in office accounting.

These baling tickets, Fig. 2, should be made in duplicate or triplicate, with carbon paper, the original to be kept on file in the cloth room, and a duplicate put into each bale or case, where it will be sure to be found by the buyer. If a duplicate is required for the main office of the mill, two carbon copies should be made. The original should go to the overseer's desk as soon as made. The bale duplicate should be put between the two top cuts on the truck of goods until ready to bale. When the truck is ready to be emptied either into press or case, someone should stand by, and as the goods are laid in, check each piece to see that there is no error in the listing of yards, or no mixing of styles. A careful and reliable man should do this, and if he finds it O. K. he should approve the ticket in the place marked "approved by;" if not, he should stop the packing, return the bale to the checker and notify the overseer. A competent overseer will soon locate the proper man for this work. In small mills, the overseer himself may have it to do; in medium-sized mills the second hand can do it, and in large mills a special man may be employed, and give it his whole attention. The exact cost, if any, will be very slight, and will more than be repaid in making good claims for short yardage and mixed styles, and a buyer receiving a packing slip like this, carefully and neatly prepared and approved, will be very careful that he is right before entering a "kick."

Blank Cotton Mfg Co
Gainesboro, Ga

PACKING SLIP

Bale No. 10001
Style No. 12345 Pattern 2
Checked by Smith
Approved by A. J. L.

NOTICE

THIS BALE HAS BEEN CAREFULLY CHECKED AND APPROVED, BUT ERRORS WILL SOMETIMES OCCUR. IN CASE OF ANY COMPLAINT BE SURE TO RETURN THIS SLIP GIVING FULL PARTICULARS.

✓	49
✓	55½
✓	54½
✓	57½
✓	55
✓	55½
✓	60½
✓	48½
✓	56
✓	57
✓	54
✓	55½
✓	55½
✓	55
✓	58½
✓	55½
✓	55½
✓	55½
✓	67½
✓	55½
✓	55½
✓	55½
1223	TOTAL YARDS

Grade B Pieces 22 Pounds 304
Average Wt. 4 02

FIG. 2. THE PACKING SLIP.

With this slip properly executed, we now proceed to the book records proper. We first have, Fig. 3, the detail yardage record. This is really a book of original entry and equivalent to the merchandise or credit journal of a retail business house. Here the bales are entered as baled in consecutive order, to be posted later into the ledger or permanent record, Fig. 4. Much can be said in favor of the detail book, Fig. 3. In very small mills where all records are kept in the main office, this might be the only book necessary, but if the system is at all reliable and progressive, and if the mill is to make more than one kind of goods, some form of bale ledger, Fig. 4, must be kept.

Where this book is properly kept by an accurate overseer or bookkeeper, and is kept in the cloth room, it is then possible to dispense with the book shown in Fig. 3 altogether, but I do not deem it advisable to do so, as it

DETAIL YARDAGE RECORD — Blank Cotton Manufacturing Co.

DATE	BALE NUMBER	YARDAGE IN DETAIL EACH INDIVIDUAL PIECE	STYLE No.	PAT No.	GRADE	PIECES	YARDS	POUNDS	AVE. WT.
8-1-13	10001	49 55½ 54⅜ 57½ 55 55½ 60½ 48⅜ 56 57 54 / 55½ 55⅜ 55 54½ 55½ 55½ 55⅜ 67½ 55⅜ 55⅜ 55½	12345	2	B	22	1223	304	4.02
"	" 2	110½ 112 111 110 110 112 111 110⅜ 110½ 111½ / 111 109	978		a	12	1328½	315	4.21
	" 3								
	" 4								
	" 5								
	" 6								
	" 7								
	" 10								
	" 11								
	" 12								
TOTALS							2551½	619	

FIG. 3. DETAIL YARDAGE RECORD BOOK.

serves a double purpose. First, in eliminating the possibility of duplicating bale numbers and causing untold confusion months, or even years, later, because one bale is found in the storehouse marked a certain number, while the records show a bale of this number to have been shipped long since. Numbers are also likely to be left out entirely and cause confusion in a similar manner, which no one can intelligently straighten out. Another, and possibly the best service it will render, will be as a check book, on packing slip, Fig. 2, and to check the bales into the storehouse from the cloth room to see that they are properly stenciled.

The head of each bale should be stenciled showing the number, style number, yards, grade, etc., and before going to the storehouse each bale should be checked and any errors corrected.

If a mistake in the marks on a bale gets to the storehouse, the person finding the mistake, a new overseer, perhaps, would experience great difficulty in straightening out the tangle. While I do not think this book, Fig. 3, should entirely be dispensed with in any mill, yet where the original baling or packing slips are kept properly filed, I do think it could be abbreviated and modified considerably. For instance, that part under the head of "detail yardage, each individual piece," could be entirely struck out, thus reducing the labor and writing by about two-thirds.

A proper filing case should be provided for the packing slips, Fig. 2. To do this, have a box made of smooth boards a bit longer than the tickets with the bottom, one end and both sides closed. Near the closed end, sufficiently far inside to permit the tickets to go down easily, insert a stout wire through the bottom. Perforate the tickets at the bottom with a regular office perforator so as to cut a nice, clean hole. Place the tickets on this wire in con-

BALE RECORD.

Blank Cotton Manufacturing Co.

Style No. 12345 Pat. 2

DATE BALED	BALE No.	GRADE	PIECES	YARDS	POUNDS	ACTUAL AVGE. WT.	SHIPPING TICKET No.	YARDS SHIPPED	POUNDS SHIPPED	DATE SHIPPED
BROUGHT FORWARD										
8-1-13	10001	B	22	1223	304	4.02	145	1223	304	8-5-13
8-5-13	" 093	a	12	1214½	303	4.00				
8-13-13	" 105	C	12	1220	304	4.01				
				3657½	911					
CARRIED FORW'D.				2434½	607					

Insert D.A. Summary

Brought forw'd from last mo. ___ yds. ___ lbs.
Baled this mo. 3657½ " 911 "
Available " " 3657½ " 911 "
Shipped " " 1223 " 304 "
Carried forw'd. to next mo. 2434½ " 607 "

FIG. 4. THE BALE LEDGER RULING.

secutive order with the numbered end down and place an easy fitting wood or metal weight also perforated so as to slip on the wire. This weight should be nearly, but not quite, the length of the box. Then, when the occasion demands, and if it is desired to find a certain slip, go to the file box and lift up the lower or numbered end of the slips until the one desired is found. At regular intervals empty this file box, but do not throw the tickets away, as some day the inability to find a certain one will occasion more worry and loss than the few minutes required to properly preserve them, which can easily be done by taking an ordinary "tacking" needle and threading the tickets on a stout twine, being careful to preserve the consecutive order. When properly threaded, bind them with twine, being careful to leave the section near lower or numbered end loose for inspection purposes. Then take a common shipping tag and mark thereon the extreme dates covered by the package, and put carefully away until needed. Later, when the "kick" comes, look on your records and see what date the goods were baled, find the package in which this date is included and your slip, with all its evidence, either for or against you, is there.

We will now consider Fig. 4, which is the ledger of the room and the real record of importance. Into it is posted on the left or debit side either from the detail yardage record, or where not used, from the packing slips direct, all the essentials of the bale. Instead of entering in consecutive order, however, each ticket is entered under its individual style and pattern number. I have illustrated a few entries, which will explain its use better than language. In the third column marked "grade," the letters B, A and C occur, and to make the use of these clear I will explain that goods of the same style and pattern will, of course, vary as to grade. For instance, most selling agents require goods baled about as follows: Double cuts first quality; single cuts first quality; double cuts second quality; single cuts second quality; shorts, 20 to 40 yards and 10 to 20 yards; and remnants 5 to 10 yards and 1 to 5 yards. For the same reason that style numbers are used grade letters may also be used. Double cuts first quality are represented by A; single cuts, B; double cuts, second quality, C; single cuts, D; and so on down the line so far as the grading is required. It is merely a means of saving labor.

The right or credit side of the ledger has to do with shipping alone. Some will, perhaps, object, because the cloth room does not have anything directly to do with the shipping, and I am fully aware that in some large and good mills an attempt has been made to separate the two, but at best the experiment has not succeeded, and in many cases has brought friction and hardship, for the two are like Johnnie and his skin, they are inseparable, at least, without pain.

Even where there is a shipping clerk, the cloth room overseer usually makes everything ready for him, gets the goods out in proper shape and at the proper time, often getting them out of the warehouse, stencils them, and does everything but check a few figures, make out a few invoices and draw the salary for doing it. If the manager has an anemic cousin whom he feels he must support with a pension under the guise of "shipping clerk," it is O K, and nobody's business, but he should do the thing right and put him in the cloth room to keep the books, and thus relieve the overseer so that he can spend his time in planning and executing things of greater value.

One of the very first things taught in the bookkeeping courses is that in double entry bookkeeping, "For every debit there must be a credit, and for every credit there must be a debit." In the ledger we have our account charged with every bale put up, but as we put the goods up to be shipped, then when we do ship them, we have a perfectly natural credit, and by deducting the one from the other, we can easily find out at any time the amount of any style of goods we have in our warehouse.

Whether the cloth room does or does not do the shipping is immaterial, as nearly always the overseer has to prepare the tickets, even when the work is handled by another. However, we will leave this part of the system for the next paper.

COTTON GRADING.

(Contributed Exclusively to COTTON.)

BY PROF. JAMES G. COMAN, CLEMSON COLLEGE.

The subject of cotton grading or cotton classing is receiving an increasing amount of attention from cotton growers and also from small cotton mills that have not paid much attention to this matter in the past. The farmer realizes that he often does not receive the proper premium on his cotton of the higher grades and of long staple, especially where competition in the matter of buying is lacking or limited. In this article will be discussed the principles of cotton classing, or the factors which affect the value of cotton and it is hoped that when it is pointed out to the grower or prospective grower of cotton, how different influences affect its value, he may be able to avoid some of those which tend to lower the value and in this way secure a better price for his cotton.

To become an expert cotton classer one must spend many months in the actual cotton trade and handle a large amount of cotton. One must become familiar with the customs of the market in which he expects to work and to become a successful cotton buyer, must do a certain amount of the office work in order to become familiar with the business practice.

It is a well known fact that in the past each section of the South had its own standard of grades. This rendered trading between them difficult, as cotton graded middling in one section, might be either above or below middling in another and a mill in one section ordering 100 bales of middling cotton from another and not submitting a type might have 100 bales of strict low middling, according to the mill standard, delivered. To remove this difficulty and establish standard grades applicable to all sections of the South, the U. S. Government called together several experts representing different branches of the cotton trade and had them determine nine grades of cotton, five full and four half grades. Using these for comparison the government has prepared and sold at a nominal cost, sets of what are known as "Standard Grades." Sets of the grades have been secured and adopted by most of the leading markets of this country and several abroad and many cotton mills have also secured them, so it is probable that in a few years they will be universally adopted for all cotton grown in the South. However, the standard grades have not been adopted by all the cotton markets of the South and while the same kind of cotton will bring about the same price in all the larger markets—allowing for a difference in location with respect to ports and manufacturing centers—still in view of this diversity it becomes necessary to follow one of the larger markets in the method

of classification. As New Orleans maintains an exchange for future trading, is a very large spot market, uses the government standard of grades as a basis of all spot transactions and issues a daily market report from which the approximate value of the cotton in that section can be obtained by deducting from their quotations the amount of the freight rate to that city, that market will be used as a basis in the succeeding methods of classification.

The nine government grades are, beginning with the lowest, good ordinary, strict good ordinary, low middling, strict low middling, middling, strict middling, good middling, strict good middling, and middling fair. The four grades prefixed by "strict" are known as half, the others as full grades. The New Orleans market recognizes in addition to the above four other grades, two below—ordinary and low ordinary—and two above—middling fair to fair and fair. Quarter grades, those between the half and full grades and designated by the prefixes "barely" and "fully" are recognized by the New York exchange and the Liverpool and other foreign markets. Barely middling is the quarter grade below and fully middling the quarter grade above middling.

Middling is the basis grade, all others may be considered as standing above or below it. Grades below middling contain more and more defects and those above fewer defects. Market quotations, unless otherwise stated, always refer to middling cotton, the other grades bringing more or less than middling depending on whether they are above or below.

The grades must all be learned by appearance; no description can be given that will enable one to recognize a certain grade at first sight. Classing can be learned only by much practice and necessitates training the eye, the sense of touch and the exercise of considerable judgment. The grades of cotton are only relative and while length of staple is usually expressed in exact units of measurement, errors in staple are more frequent than errors in grading. No principles therefore, can be laid out which will enable one to proceed to class cotton without a great deal of practice with actual cotton. There are, however, certain factors and causes which affect the value of cotton and certain recognized methods of procedure, and attention will be directed to some of these in this article.

FACTORS DETERMINING GRADE.

Trash and other foreign matter is the most prominent of these. Every bale of cotton contains a certain amount of trash mixed in with the fibers, principally obtained during picking. This trash consists mainly of particles of leaf, though pieces of stems, seeds, etc., are often included. Most of this so called leaf comes from the inclosure or shuck, the leaf like organs at the base of the boll. This portion dies and dries up after the boll opens and a certain amount of it is easily picked with the cotton. After frost the real leaves die and crumble easily and a certain amount of real leaf may easily be picked with a handful of cotton.

The larger the particles of leaf in the sample the more easily they can be removed in manufacturing and the less objectionable they are. Samples containing small pin head trash should be graded lower than samples having an equal amount of leaf in larger pieces.

Besides this leaf, other foreign matter may occur in the cotton, increasing the amount of waste and restricting the classes of yarn which can be spun from it. This foreign matter may consist of seeds, motes, small lumps of immature or diseased fibers, pieces of stems, burrs, etc. Motes are pieces of seed or immature seeds each usually with a certain amount of fiber attached. The nature of the other defects mentioned is obvious.

These defects should be taken into account in order to arrive at the proper grade of a sample of cotton. Other foreign substances often included in the cotton are dust and sand. These lower the value materially, but when very perceptible they should not influence the grade. The grade should be established on the basis of the trash referred to above, leaving the dust and sand out of consideration. These defects must then be considered independently and such cotton should be regarded as irregular, that is, not standard.

The process of ginning also has some effect on the grade. Poor ginning produces a roughened and somewhat tangled appearance of the cotton in contrast with the smoothness which is a much desired quality. Very poor ginning results in neps or neppy cotton and in gin-cut cotton. Neps are matted and tangled fibers occurring as small condensed flakes. When present in quantity they are hard to remove and if not removed show very distinctly in the finished product, materially reducing its value.. Gin-cut cotton is cotton more seriously injured in ginning than neppy cotton and having a more "chewed-up" and "stringy" appearance. All these defects reduce the value of the cotton because they increase the amount of waste. The fibers are matted and tangled together so that many of them cannot be straightened out in the processes preparatory to spinning and are taken out as waste. Gin-cut fibers are of course shorter than the staple for which the cotton is bought and consequently increase the amount of waste. These troubles are caused by ginning cotton when it is wet or by running the gin saws too fast. The first cause may be overcome by storing the seed cotton for a period of two weeks or more in a dry place. If noticeably moist the cotton should be dried out before storing, otherwise it will heat, destroying the value of the seed for planting. Beside reducing the liability of gin damage, storing seed cotton has the following advantages: A higher yield of lint due to cleaner ginning of the seed; the fibers are more lustrous as some of the oil in the seeds seems to be absorbed by them; the strength of the fiber is increased as it is allowed to fully mature before removed from the seed; the seeds are much preferred by cotton seed oil mills as the moisture is dried out and a better oil can be obtained from them; the liability of getting a plated bale, due to the gin stands being poorly cleaned out after ginning a former lot of cotton, is diminished; and the mixture of the seeds of separate lots of cotton from the same cause, which destroys the purity of one farmer's variety, is done away with. Against these advantages is the fact that the farmer will lose from five to ten pounds in weight on a bale of cotton due to the drying out of the excess moisture in the green cotton.

Long staple cotton is more subject to defective ginning than short staple because the long fibers are naturally more easily tangled and cut. For the successful ginning of long staple cotton on saw gins the speed of the saws must be reduced.

As stated above, these defects lower the value and when only slightly present, or just enough to give a roughened appearance, may be considered to some extent in reducing grade along with trash. But when the cotton is considerably gin-cut this defect must not influence the grade; that must be established on the trash and then modified by the term, gin-cut. The value but not the grade will then be

lowered and just as in the case of dusty and sandy cotton referred to, it is irregular.

Cotton is often discolored in various ways but the grade should be very slightly affected by any discoloration. It may be said that a slightly dark, smoky color may be present in the lower grades, but such color must not be too prominent in even the lower grades and is not tolerated in the grades of standard cotton above middling. The range of this color will be noticed by referring to the cotton in grades of the official standard. It will be seen that in the grades below middling the fiber is slightly darker in each of the lower grades as well as more trashy. However, when we meet cotton which is darker than the standard type for that particular grade, the cotton must be graded just as if its color was standard and the color considered separately.

By irregular cotton, or cotton not represented by the standard grades is not meant that the irregular cotton referred to does not have grade, but the idea is that these irregular cottons possess certain qualities in addition to grade that are not represented in the official types. Cotton of this sort has already been referred to as dusty, sandy, gritty, gin-cut, blue or smoky, and discolored. We can have standard and irregular cotton of the same grade. While standard cotton is white and has no other defects which can be detected by observation except those which fix the grade, irregular cottons have certain bad qualities which are considered here in addition to and independently of grade. Below is shown a list of these different classes as recognized by the New Orleans Exchange and regularly followed by the board of classers of that institution: Standard, Off Color, Spotted, Light Tinge, Tinge, Light Stained, Stained, Flash Dust, Gritty. These classifications are taken from the blanks used for representing the classifications of each lot of cotton classed there. These classes are the ones recognized in this article with one addition, namely, blue or smoky, and these terms will be used in describing samples.

Certain markets which have not adopted the standard grades or perhaps some which have adopted them but do not follow them closely, regularly take some of the qualities designated above into consideration in determining the grade of a certain sample. This practice is not consistent with the purpose for which the standard grades were established. Of course when spots or other defects are taken into consideration in grading, the cotton must be less trashy than standard cotton of a certain grade in order to fall in that grade. For instance, if a sample shows a few spots and parties classing cotton on the Savannah market say that it is of low middling grade, then the sample must necessarily be freer from trash than low middling without the spots in order to bring low middling value. The quotations for the different grades from those markets which follow the government standards closely, refer to white upland cotton exactly similar to the standard grades.

As stated before, color affects the grade but little if any, but may affect value considerably. We ordinarily think of cotton fiber as white and this is correct in a general way but experience will enable one to detect various shades of color in cotton. White cotton, in the language of the cotton classer, means that which is in no way discolored, or cotton showing no defects of color. There are some cottons which are not naturally white. Egyptian, for instance, regularly runs from a creamy shade to a light brown.

Colors in American cotton are not natural but constitute defects. A slight creamy color is probably the most common and the least objectionable. It is said to be due sometimes to the soil conditions and to be more prevalent in cotton grown on red clay and black soils than on lighter ones. It is an interesting fact that cotton in freshly open bolls is often more creamy than that in bolls which have been open for some time and have exposed the fibers to the bleaching effect of the light. Ordinarily a slight creamy color will affect the value very little if any in short staple cotton and it would not be considered a defect, some manufacturers preferring cotton of this color to that of a purer white. When this creamy color becomes too pronounced, however, the cotton is classed over into the off-colored type.

The different kinds of discolored irregular cotton are due to different degrees of the same cause, namely, the effect of frost on the bolls before they open. The respective classes are more discolored in the order named: off-colored, spotted, tinged and stained.

If frost occurs before all the bolls are open, the cotton from any bolls which may open later will be colored reddish and the degree of the color and the amount will determine the class of the discolored cotton. The degree of the color depends to some extent on the stage of the bolls at the time of and the severity of the frost. The nearer ripe the boll the least discolored it will be, while the heavier the frost the deeper the color and the lower the value of the cotton. Of course a great many bolls are killed by frost every fall that never open at all; many bolls, however, are far enough advanced to open subsequently and the tinged, stained, and similar cotton is picked. Frequently bolls which do not open entirely but merely crack are gathered whole. Bolls, cotton and all are then run through machines with which some ginning plants are equipped, which tear open the bolls and separate the cotton from the burrs. Such cotton is always very much discolored and carries a large amount of waste, principally pieces of burrs. The cotton is consequently very low in grade and is variously called "hulled," "threshed" cotton, "bollies," "grab-alls," "dog tails," etc.

Off-colored cotton is the first class of irregular cotton and sells at smaller discount from the standard grades than any of the others. June 10th, 1913, it was quoted at 1/16 off strict good ordinary and above and 5/16c off grades below. Thus, middling quoted at 12⅜c, if off-colored would bring only 12 5/16c; ordinary quoted at 9 13/16c, if off-colored would bring only 9½c. Off-colored cotton has a slightly yellowish, reddish or pink cast, or it may have a deep cream color. It is usually caused by frost, although off-colored cotton creamy in color is probably due to the soil. The color must not be too deep, for it will then be called tinged or stained, and it must be evenly distributed through the cotton and not confined to spots. The term "off-colored" is used in some markets to designate any sort of discolored cotton but should have and has in the New Orleans market, the limited meaning discussed above.

(To Be Continued.)

Every day, we see men of boundless energy, whose efforts bring small results. We see men, loyal to a cause, and willing to work, who plod unseeingly and unthinkingly along, because they have not aimed their energies toward a definite end. They perform as much labor as the efficient man, but they violate every physical axiom, in being a cause, without effect. In other words, they are inefficient.

KNITTING.

METHODS OF REPAIRING KNITTED FABRICS.

(*Contributed Exclusively to* COTTON).

BY WILLIAM DAVIS, M. A.

When knitted goods are being made ready for the market, it is necessary for most branches of the trade to subject them to a close examination for flaws incurred in the process of manufacture, and those due to the presence of foreign bodies in the yarns. In many factories this operation is brought about in two divisions, that which is done after the cloth leaves the frame, and that which is effected when the trimming and finishing have been completed. Frequently the former operation, also known as greasy mending, is dispensed with, the frame workers being required to give in the work free from holes and flaws, ready to be scoured and milled.

The extent and care with which mending is practiced depends on the style of the firm's trade. If the market is for articles of the cheaper kind, there is not time for a careful examination and repairing of the cloth, and some short and rather careless methods are adopted to insure the production. Holes are not carefully filled out with new stitches, but merely drawn together in a way that will not be noticed. If the goods are in a condition to pass the supervision of the buyer, they are considered satisfactory.

In higher branches of the business, however, higher ideals must prevail and great care exercised in the repairing departments. The frame worker is frequently required to mend the flaws before parting with the goods, but this system is open to some objections. He is generally in charge of a large machine from which the manufacturer must exact the maximum output. If, therefore, the operator busies himself frequently in mending the flaws, the machine is stationary and the resultant loss is considerable. Many manufacturers find it more profitable to ask that the work be turned out as perfectly as possible, but they also require that the machine should be kept running at all costs and hands over the repairing work proper to workers who do nothing else in the factory and who are skilled to recognize the imperfections and have ready means of mending same.

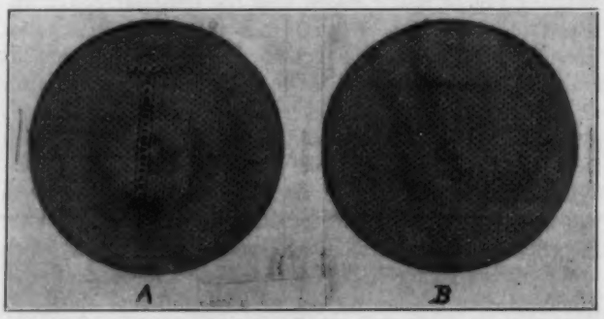
INCIDENTAL DEFECTS.

Under this head may be included the defects of the knitted fabric which are more or less incidental to the yarns and knitting proper. Of these, burrs and knots are the most common. Burrs and thick pieces are present in most kinds of yarn, and they ought in reality to be removed on the winding machine. Many object to this method of removal on the ground that the clearers through which the yarn is made to pass, press it unduly and tend to disturb the arrangement of fibers, as well as putting unusual strain on the thread. If the clearers are set farther apart so as to avoid this, then none but the larger burrs are removed. Burrs are much more common on cheap yarns than on those of good quality. The clearers cannot be said to be very successful in taking out the thick places due to irregular spinning of the yarn, and which are found in most kinds of threads.

Knots are the most common of the incidental defects, and the manufacturer seeks to eliminate them by using large bobbins, so as to obtain as great a length of continuous thread as possible. We shall not go into the matter of the best way of tying knots, but just indicate that unless mechanical knotters are used, it is a branch in which operators are very defective and that some attention should be given to the subject whenever new workers enter the factory. This will save endless trouble in all subsequent work and prevent a large amount of waste, both of time and material.

GENERAL PRINCIPLES OF REPAIRING.

It is not possible to give in an article any definite instructions as to how fabrics may be mended, because that cannot be done unless the fabric itself is at hand, but we shall indicate the chief defects which it is the work of the examiner to put right. If a stitch has been broken, a common thing is for the loops to give way in a vertical direction, and the work of joining up the loops cannot be said to be difficult. A needle with a small hook is employed, and the lowest perfect loop is taken up, and the others linked up one after the other. When the vertical row has been joined up, the last loose loop is secured to



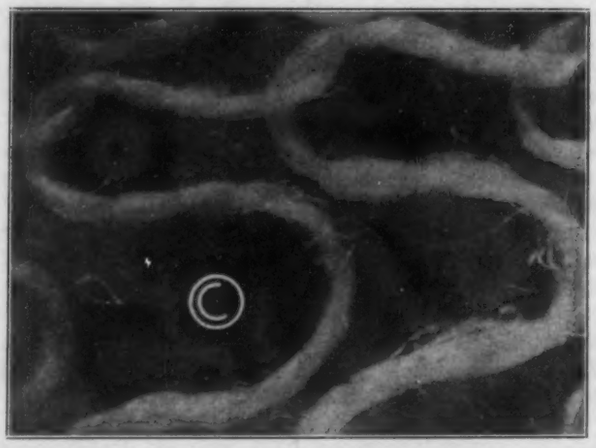


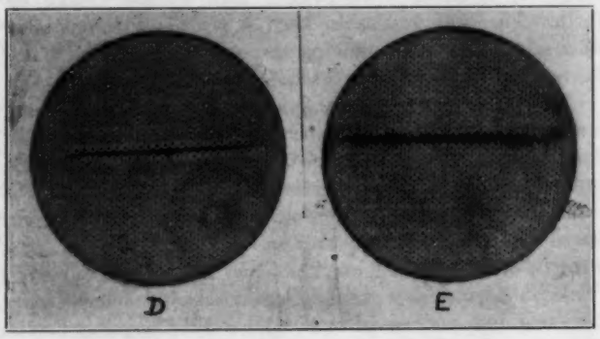
FIGURE N.

the one above and the mend completed along a few stitches on each side in a horizontal direction.

When the fabric becomes damaged crosswise, the mending is a rather more difficult matter. If the flaw is in the nature of a cut across, then we shall have above and below, loose stitches which require to be joined together by a new thread. The worker passes the needle from the upper stitches to the lower ones alternately, connecting the

loops with a thread the same as the ground, again drawing the loose thread 'round to the back when the cloth has been joined up. If the yarn is not exactly the same as that of the fabric, the mend even if so perfectly performed will show in the cloth, and the cure may be worse than the original defect. This is especially the case when a thinner thread is used and the resulting mend appears as if it had just been drawn together, the loop spaces not being filled out properly. When repairing has to be done, it is usual for the frame worker to append a piece of the yarn from which the garment is made.

Illustrations A, B and C show the kind of defects just referred to with the relative repair done in a colored yarn so as to show up the mode of procedure. Illustration A shows a row of dropped stitches which have been run up again connecting the stitch below to the one above, when the top of the row is reached, the mend is completed in a horizontal direction, which is shown in Fig. B in a yarn of different color. The loose ends should be carefully secured on the back of the cloth by running them in for a few stitches further along so as to give them a firmer hold and prevent them from coming loose again and so undoing the work. Illustration C shows a photo-micrograph of a



row of dropped stitches considerably enlarged which will serve to explain their connection with the stitches on either side.

Fig. D shows a row of loops severed in a horizontal direction giving loose stitches above and below. In Fig. E the stitches are joined again by means of a new thread set in crosswise in color so as to show the join. It need not be pointed out that there is great scope for skillful fingers in this operation, because if the loops are drawn the least too tight or too slack, it will show a defective cloth. Another common defect in mending occurs when the stitches are not entirely taken in by the needle, but the yarn is split by it. Sometimes also the thread is inserted in such a way as to break the continuity of the rows of loops, the loops are jointed but the needle has made a wrong turn and the thread is passed over instead of under at a certain point.

(To be Continued).

Efficiency does not mean working hard until the day is done. It means working hard and getting results. To use a baseball expression, it means "mopping up" with the situation. It means the saving of useless motions, the conservation of mental resources, the elimination of worry and friction, the spirit of cooperation, the absorption of new ideas and improved methods. It means progress in one direction, instead of running in circles, like a blindfolded man.

ELIMINATING WASTE IN KNITTING MILLS.

In considering this subject we must recognize that certain kinds of waste are unavoidable. In the finishing room in a large mill there are a great many things to look after, in fact an endless amount of detail. First of all there is the help through which time as well as material can be wasted. Some managers think nothing of changing help, but waste is made every time a change is made. When a certain amount of change in the working force takes place this means waste, as every hand in the finishing room and elsewhere, no matter how unimportant, represents a certain cost, so that every time someone else has to be broken in waste in time and material and poor work is sustained.

First of all, then, to eliminate waste in the finishing room, it is necessary to find the best man possible to take charge, pay him wages enough so that he will think the job worth something to him, and show him proper respect, because it is no use to expect the best possible results from an underpaid or poorly treated overseer.

We know of a mill which had a woman in charge of the finishing room. One day she took one girl from a machine and put her on another machine which she had never run before. Then she took another girl from another machine and put her on the machine left by the first girl, and then put a new girl on the machine vacated by the second girl. This meant that three girls were learning in the place of one. The two girls in the mill when the new beginner came could have been left where they were, and the new girl put on the one machine, which would have meant one learner in the place of three.

Some practical reader may say that the forelady may have wanted to promote these two girls, as they were on day work at the same rate, but changing girls about from one machine to another should be avoided as much as possible, as it hinders production and causes more bad work.

A good sewing machine fixer is an asset to any mill, and a whole lot of waste can be eliminated by hanging right on to him. To have the machines in good running order means better production, better satisfied operators, which all means the elimination of waste in both time and parts. We have known of mills where the manager thought that every time the fixer wanted a part he must find out what is was for, if the fixer could not get along without it, etc., and perhaps even cut the fixer's order in the office. This meant waste, although the manager thought that he was saving money, but I will show this did not work out.

On going the rounds one day it was found that the band folding machine did not fold the bands properly, one side not being creased in the right manner. On examining the machine it was found that the presser screw on one side of the machine was stripped and instead of the fixer getting a new one he had fastened down this side with some stove-pipe wire. The fixer on having his attention called to the matter said, "Oh, well, I can't get anything to fix with," the fact being that every time he made out an order for some parts his knees would knock and his teeth chatter on thinking of what that manager would say.

The manager was well satisfied that he was eliminating a lot of expense at that end, but a time came when the whole batch of machines had to be overhauled, causing considerable expense and delay. The best way to eliminate waste in a finishing room at the sewing machine end is to keep a good man as fixer and give him to understand that he can have all the parts that he legitimately needs.

The first operation in a finishing room is looping, hemming, seaming, overedging or putting on cuffs, depending on the kind of goods made or method used in operating. When overedging, the girls will get into the habit of keeping the machines running between shirt bottoms, that is after having finished one and picking up the next ready to run it in. This of course, means waste of thread, it also wears out the feed and presser foot. The best way to eliminate this waste is to teach the girls properly when they first come into the mill. To stop old operators from bad practice is often more than can be undertaken and carried out successfully. The next operation is, say, seaming. There are trimming attachments on these machines, and the operators if not watched will get into the habit of seaming off a lot, gouging out and spoiling the garments, making seconds, etc. The best way to eliminate this waste is to keep guides on the machines, some machines being a little harder to use guides on than others.

The writer has seen guides used on trimmers and the seamers waste was less than half as heavy as in mills where these guides were not used at all.

Putting on button stays and facings is generally done automatically, that is a long strip or roll of the facing material is used and one garment run in one after the other. Here quite a little unnecessary waste is made, by running out too far between each garment and this can best be eliminated by taking proper care when the operators are broken in. The most reasonable way is to figure out and show each operator what it means to have this unnecessary waste. This same thing applies to trimmings on necks, collarette, binding, edging, whatever the material is that is being used.

Button stays, facings, drawer bands, straps, and similar trimmings are cut out of various kinds of cloth and a great deal of care is necessary in order to get proper results. A great deal of waste can be made by carelessness in doing this work, and using poor judgment as to how many strips to cut out of the piece. Drawer bands for men's or boys' drawers, and similar kinds of trimmings, should be cut according to orders going through, a good way being to make out an order when the cutting order for the cutting room is made out. This would eliminate the cutting of sizes not wanted, especially where special orders on different colors are made. If care is not taken, soon a whole lot of such stuff accumulates, and finally becomes waste. Buttons need to be watched very closely, the operators will become very careless if not watched, it being understood if the mill is an old one that all the cracks in the floor must be filled up. When the sweeper gets to this part of the finishing room in place of dragging the dirt from this part of the mill all over the place it is a good practice to have it understood that he is to sweep up around the button-sewers and take the dirt up right there and pick the good buttons out, and sort out the different sizes at once, rather than let all sizes and kinds be allowed to accumulate unsorted.

The old way of putting the goods in process in the finishing room into bins, to be carried and carried back and forth is very wasteful. Where the work is handled in such a way, sometimes two or three hands are kept busy doing nothing else but to carry work, help keep it straight and find sizes. This waste of time can be eliminated by having the work go through in trucks, this method is now used in many mills and it gives great satisfaction.

Most of the work in the finishing room is done by the piece, checks with coupons to cut off by the operators being tied on the goods before leaving the cutting room. These piece work checks or coupons sometimes get lost or stolen, in fact in some mills it is a very hard thing to handle. On these checks an individual number should be printed in fair sized type on the coupons which the operators cut off, the same number also appearing on the stub. Should a dozen be found not buttonholed but check cut off, all that would have to be done, would be to examine the coupon books, so that it can readily be seen how easy it would be to find out who turned in the coupon with the number corresponding to the one on the dozen without a check. There should be no occasion to have any checks come into the office to be paid for and the work in the finishing not done. Should the check really be lost it would then not show on any of the books.

Another waste in a finishing room is to allow the girls to go to the cutting room and get pieces for wiping or cleaning. If not watched they will get good pieces which could be used for sleeves, etc. A good way is to have the overseer of the cutting room deliver to the overseer of the finishing room pieces which could not be used for anything. Some mills have these dirty rags washed and returned to be used again.

Some operators are very careless in taking care of their machines, breaking more needles than necessary, and so forth. The best way is to keep a record of the needles when given out, thus enabling the overseer to know where the needles go to, who the careless operators are, etc.

To eliminate waste in a finishing room will be a busy man's job. One good thing to remember is that it is hardly fair to expect operators to take interest in their work unless interest is shown in them, so that a good way to commence eliminating waste not only in the finishing room, but in the mill in general, is for the owner, manager, and superintendent to show an interest in the operatives.

With present day rush and push this last thought may be waste, but more could certainly be said along this line.—*Canadian Textile Journal.*

Progress of Artificial Silk Industry.

Consul William H. Hunt, St. Etienne, France, reports that processes for producing artificial silk continue to multiply. New means of rendering the silk strong, supple, and brilliant are constantly being discovered, and the industry has now attained a high degree of perfection.

The dry-weaving process, by which the solid thread is directly obtained, has replaced the use of coagulating liquids. In spite of this, nitrocellulose silk is disappearing from the market because it cannot enter into competition with other artificial silks obtained by a simpler process and which are cheaper and more solid.

The first of these rival productions was obtained by dissolving cellulose in cupro-ammoniacal liquor. The difficulties encountered in this operation brought about the discovery of cellite, an acetyl cellulose, soluble in acetone, which might be employed for cinematograph films, being incombustible, were it not for its too great suppleness; it can be used for coating wood and metals for it does not crack. Another substance of the same nature is sericose, which is used for printing on calico.

The solidity of all artificial silks may be increased by treating them with formaldehyde, which operation is called "stheriosage."

The report just issued by La Soie Artificielle, Givet, discloses a net profit of $201,100, against $144,500 the previous year. The capital is $289,500.

DYEING, BLEACHING AND FINISHING.

PRINTING COLORED DISCHARGES.

(*Contributed Exclusively to* COTTON.)

BY ERNEST STUTZ.

The production of the blue-red style, illuminated also with white, has for a long time been the object of research because a beautiful blue combined with a handsome red is not only pleasing to the eye as a color scheme but also an effective combination in an optical sense. For the cotton printer it offers a wide field for effective pattern styles and the consumer likes the blue printed style as well as the red style in all its shades.

It is produced by printing blue on red dyed fabric or *vice versa*. The standard for blue printed on red is the well known indigo alizarin style of Schlieper and Baum which has been brought to the highest state of perfection. This extremely complicated and difficult method is however supplanted almost entirely by para red on which are printed basic colors, dianisidin blue, or lately, modern violet or chrome colors.

In these styles the effect of a blue ground on a red dyed material is aimed at, because such an effect is generally liked, and special care is taken therefore to get as beautiful a red as possible on which to print a blue ground. It is unavoidable that a considerable waste of color occurs in the use of these methods. First of all the goods, on account of the red patterns, must be dyed on both sides, then the printing necessitates a considerable consumption of thickeners as well as solvents and additions to the blue color and finally printing a ground color is technically always a more complicated and troublesome proceeding. For this reason chemists endeavored to find a method of red discharging on blue ground. Indigo alone is suitable for that purpose and the indigo and red style can be produced by either the resist or the discharge method.

The resist method for development colors under indigo labors under the disadvantage that especially engraved cylinders are necessary. The delicate designs, fine lines, pin points, etc., either by themselves, or combined with more solid patterns, such as are customary in discharged styles, cannot be used at all. This kind of style produced by the resist method shows therefore mostly coarse and clumsy patterns. They must be engraved especially for this method and are then hard to utilize for other purposes, nor can the cylinders already existing in a modern print shop be utilized. Naturally this method is chiefly used on Perrotine machines but in so slow a process the thickened diazo colors present difficulties in operation through insufficient stability and lack of uniformity in result, besides being uneconomical. Another disadavantage lies in the fact that the presence of chromate of potassium in the paste is liable to tender the goods, particularly in the solid red patterns. In souring, which is unavoidable after dyeing in indigo, this addition acts as a discharge agent to cleanse the red but has also the effect that in use, particularly after repeated alkaline washing, the discharged parts get weaker and finally are torn.

Similar but more pronounced defects occur in the discharge style which is based on the chromate discharge using chromic salts of sodium, lead or Baryta; these produce oxycellulose in the subsequent passage through hot acid. On account of this uncertainty the method has therefore not been adopted anywhere. The steam discharge process of the *Fabriques de Produits Chimiques* has various technical disadvantages, and is unreliable in the shading of red and also in the discharge effect.

The nitrate discharge method of indigo with development colors is based on an entirely new procedure and produces patterns of the most varied design in the most beautiful and fast colors. The fibre is entirely free from oxycellulose and will stand any ordinary boiling in lye or soap without tendering. Any cylinders available for calico or discharge printing can be used, as well in heavy wide ground patterns as in delicate pin points or both together. Nothing like these can be produced by over printing or resists. Light as well as deep shades of indigo can be discharged. The printing color for white as well as for several color discharges is indefinitely stable and the discharge with diazoted combinations can be kept over night, which is not advisable with the majority of present diazo colors.

The dark blue is prepared by mixing one part of B Napthol R with one part of caustic soda and two parts of soap. A red discharge PN contains a diazoic solution either paranitraniline or paranitroorthoanisidine diazoted with nitric acid. The goods are exposed to the action of sulphuric acid (66 deg. Be'), mixed with water in the proportion of 40 to 62, at 180 degrees F for 3 seconds; they are then sprayed and washed and after passing caustic soda of only ½ deg. Be', with one more washing are ready for finishing. The entire procedure from printing to finishing takes about half an hour.

The method is particularly suitable for production on a large scale and allows of combinations with resists for discharge resists. Simultaneously with red, all other colors, such as white, pink, orange, yellow, green, blue, gray and brown can be produced in a similar discharging manner more cheaply and efficiently than has hitherto been possible. The machinery involved is very simple and existing appliances can be remodelled at slight expense to serve the purpose of this method by which over 10,000,000 yards have already been discharged in Europe.

THE MANUFACTURE OF ARTIFICIAL SILK FROM COTTON.

(*Contributed Exclusively to* COTTON).

BY H. R. CARTER.

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Spinning under the Chardonnet process is carried out either upon the wet or the dry principle, the latter being more generally adopted today. As in other systems, the clear and filtered solution is forced from its reservoir through distribution pipes to five glass capillary tubes, the latter being surrounded by wider tubes through which cold water is circulated. The capillaries as used in the process are very fine, often only 1-10 mm in diameter. Small brushes pass automatically and periodically across the in-

terior orifice of the capillaries in order to remove impurities which might prevent the free flow of liquid. The filieres or capillaries terminate in a trough of water. As soon as the solution comes in contact with the water, it solidifies and is drawn from the water in the form of a thread and dries in the air. The action which takes place in the water is as follows:

The alcohol in the solution having a great attraction for the water seizes upon it and the attraction of the alcohol for the ether is considerably diminished.

The ether acquires a tendency to separate from the mixture and at the moment of the exit of the collodion from the capillary tube of the spinning table, its power of volatilization increases in the free air and by its evaporation the mixture instantly loses so much of its dissolving capacity that the nitrocellulose precipitates and solidifies on the surface of the thread at the moment of its formation.

The thread has thus sufficient strength and elasticity to wind onto the bobbin without breaking, and dries quickly enough to prevent the threads from sticking together. In preparing the collodion, if the nitrocellulose contains less than about 12 per cent of water, the evaporation of the ether in spinning is too slow and the threads break and stick together. On the other hand, if the nitrocellulose contains too much water, the silk produced is lacking in luster. Nitrocellulose containing from 12 to 20 per cent of water gives the best results.

The distribution pipes are often of tinned copper and at the spinning table have gun metal cocks about 5-inch pitch, fitted with caps to hold the glass capillary tubes. The take-up bobbins are above and the lead of winding-on or draft depends upon the quality of the collodion. Two discs of wire filter cloth are placed in the base of each spinning tube. The spinner takes the thread as it issues from the filiere and carries it upward at a suitable speed and lays it on the winding-on bobbins, adding others until a sufficient number are united in parallel order to form a thread of approximately the desired denier. There must be a quickly reciprocating thread guide with glass eyes, and a sufficient length of travel to build the silk in cheese form. The distance from the issue of silk to the winding-on point should be as great as possible so that the spirit and water may evaporate and leave the silk threads sufficiently dry not to stick together. The spinning worm should be supplied with a rapid circulation of hot dry air to increase the evaporation and dry the silk on its way to the winding drums.

There are usually about 2,700 yards per dram in the single filament. If eight of these are wound together upon the bobbin, the resultant thread will be 2,700 divided by 8, or 340 yards per dram or 57 denier.

Under Dr. Lehner's process for spinning collodion silk, the solution being rendered much more fluid by the addition of dilute sulphuric acid, does not require the high pressure used with a more viscid solution to force it through the capillaries. Dr. Lehner's solution is sufficiently thin to flow by gravity from a reservoir placed at a slightly higher level than the spinarettes through which it flows regularly. The opening of the spinarettes are contained in a glass cell filled with water or in a narrow trough filled with oil of turpentine, petrol, etc. The level of the liquid in the coagulating trough must be always a little bit lower than the level of the solution in the spinning reservoir, because it is only this difference in level which causes the solution to issue from the capillary. On emerging from the orifice of the spinarette, the solution is at once coagulated to a transparent jelly of considerable toughness. On applying a slight pull to the jelly, grasped with the fingers or forceps, a thread is produced and on fixing the end to a light reel that is swiftly revolving at a definite rate the thread is drawn off continuously and of a uniform diameter. The ether, alcohol, etc., of the solution dissolve out to a large extent in the coagulating liquid so that a strong silk is obtained.

The spinning table is closed in by a hinged cover with counter weights, which covers give access to the machine to piece up broken threads or to doff full reels. A system of pipes is provided through which there is a circulation of cold water which condenses the vapor of the ether, alcohol, etc., the condensed vapor passes through a coil into a tub cooled by a circulation of cold water, which comes in by one pipe and runs off by another. Heating pipes are also provided to aid in drying the threads as they are reeled up.

When acetone has been employed as a solvent for nitrocellulose, the most favorable mean spinning temperature for attaining brilliant and supple threads is about 100 degrees F. According to the hygrometric state of the air, this temperature may be raised or lowered several degrees. When for the purpose of increasing the strength of the thread, there is added to the acetone employed a small proportion of acetic acid (ethyl-acetate), it is necessary to slightly raise the spinning temperature and in a general way this temperature should be raised in inverse ratio to the vapor tension of the solvent employed. The resistance to water of artificial silk may be increased by the addition of alkyl-sulphuric-acid and alcoholic potash lye to the coagulating bath.

Cellulose dissolved in zinc chloride may be reprecipitated in solutions of caustic soda or potash, to which ammonium chloride and ammonia may be added to prevent the precipitation of the zinc compound in the solution.

A strong solution of sulphate of sodium which may be acidified may also be used, as may also alcohol and water, alcohol, ether, sulphuric ether, acetic or hydrochloric acids.

For collodion solution the distribution pipes should, like the mixer and storage vessels, be of tin lined copper or aluminum. For cupra ammoniacal solution, the iron or steel vessels and pipes should be enameled inside to prevent corrosion. The corrosion of non-protected pipes is responsible for much bad spinning through the separation of rust, which is carried along by the solution and closes the spinning orifices. To help matters, discs of wire filter gauze are frequently placed in the spinning caps to arrest such impurities before they reach the orifices.

For viscose solution, pumps have been tried to force the solution through the capillaries, etc., but pneumatic pressure is more satisfactory. The pressure upon the surface of the solution in the spinning reservoir must of course be kept absolutely uniform, a dead weighted safety or air escapement valve being provided, together with a surplus air pressure. With ammoniacal solutions, it is of course necessary to use cast-iron cocks, valves, etc., owing to the action of the ammonia upon brass, for instance.

The pressure produced by a head of solution is, as we have seen, used with at least one of the more fluid solutions and is also satisfactory as regards uniformity for more viscid solutions, for which, of course, the head requires to be greater. A difficulty connected with this method of producing pressure is the oxidizing or scum forming effect of the atmosphere on the surface of the solution, which must be more or less open to the air.

(To be Continued).

Practical Problems Discussed by Cotton's Readers

We invite our readers to make use of this department for the discussion of any and all problems arising in the mill or the finishing plant. Questions, answers or letters need not conform to any particular style and will be properly edited before publishing. The editors do not hold themselves responsible for any statements of opinion or fact which may appear in this department unless so indorsed. This department is open to all.

ANSWER TO YOUNG STUDENT.

EDITOR COTTON:

I notice in your issue for November that "Young Student" asks several questions in regard to the effects of certain conditions upon the carding process and the effects of certain kinds of carding on the yarn. While most of his questions are very ambiguous, I will endeavor to answer them according to the most plausible construction to be put upon them.

First. What effect does stripping have on the yarn?

Examine a bit of the web as the comb removes it from the doffer, just before stripping, when the cylinder is packed full, and you will find it filled to a greater or less extent with small neps or small bunches of fibers and particles of dirt and trash, none of which will be in the web after the card is stripped, provided, of course, that the different parts of the card are properly set and a good grade of stock is being used. The reason for this is that all of the short fibers are not removed by the flats and become bedded in the teeth of the cylinders. After this goes on for some time, the cylinder teeth become so full of short fibers, motes, linters, and trash that as the fibers are carried from the licker-in up under the flats where the carding is done, the action of the cylinder clothing teeth only crowds and jams them against the flats, thus cutting and bunching them. When the teeth on the cylinder clothing become full, they allow the short fibers and trash to be carried off on the doffer, making a dirty sliver.

The trash and short fiber make bad running work on the drawing and roving frames and all the way through the mill, but the neps do not show up until the work reaches the spinning frame. There they weaken the yarn by preventing the fibers from lying as close and twisting together as hard as they otherwise would. The sliver just after stripping, will weigh a little lighter than just before stripping, but this unevenness will be to a large extent overcome by the evening process on the drawing.

Second. How does dry or damp air act on the card?

The card itself is not affected by atmospheric changes, except that under a dense humidity the wire or clothing that is loose will stick out at various angles due to the effect of dampness on the card fillet. But atmospheric conditions do very materially effect the fibers passing through the card. When the air is damp, the cotton absorbs the moisture, thus becoming heavier and has a tendency to gum on the cylinder teeth. Then, when the fibers are combed off the doffer instead of hanging together and being pulled slightly by the proceeding fibers into the trumpet at the calender roll, they sag down and break off. This can be partly remedied by setting the doffer comb stroke a little higher; though to do this the comb will have to be set closer. A doffer comb should be set as far off as is possible to do good work, but the limit should not be passed. The best way to remedy the evil of dampness is to raise the temperature thus lowering the relative humidity.

Dry air fills the fibers with a dry electricity, known as "Static" electricity and gives them a harsh brittle feel, making them stand out from each other and causing them to cling to the doffer wire, or the comb, and instead of being combed off and drawn into the trumpet, they choke up round the comb or are carried back around the doffer. Setting the comb stroke lower may help this trouble a little, but the only way to entirely remedy it is to raise the relative humidity. Every mill should be equipped with humidifiers, and it is a mighty good habit to turn on the humidifiers in the morning when the power is turned on. Every carder should be able to know at any time the relative humidity and temperature of his room and to adjust them. The mill is not supplied with humidifiers or with any means to raise the humidity, dry electricity can be remedied by pouring hot water on the floor around and under the cards, or better still, shooting steam under the fronts of the cards through a hose pipe.

Third. What is the average loss in strippings, flyings, motes and sand from a card?

The amount of waste from a card depends upon so many factors that it is hard to give an average without knowing to what class of work is referred. The grade of cotton used; the quality of the work done on the pickers; and the settings of the different parts of the card all effect the amount of waste, but the following figures will be found a fair average for American cotton.

Cylinder and doffer strippings	1.75 per cent.
Fly strippings	2.50 per cent
Cylinder fly	.3 per cent
Licker-in fly	.1 per cent
Motes	.6 per cent

These different items of percentage give a complete waste of 5.25 per cent.

Fourth. Which makes the strongest yarn, quick or slow carding?

This question and number six, "Which makes the cleanest sliver?" may be answered in conjunction as the cleanest slivers makes the strongest yarn.

By quick carding, it is meant a heavy lap in and a fast doffer speed, while slow carding consists in a light feed and a slow doffer speed. The former, of necessity, calls for a heavier draft than the latter. Personally, I am in favor of the light feed and the slow speed doffer, although I am aware that many carders may differ with me on this question. With the heavy feed the fibers are more liable to pass into the licker-in in bunches and not so evenly as with the light feed, thus choking up the cylinder teeth.

The carding process starts when the fibers are carried by the cylinder teeth under the first slat on the back and the fibers should be presented to this carding surface as regularly and as evenly as possible to get good results. The light feed and slow doffer gives the best results in cleaning because the light lap will be better cleaned on the pickers and, too, with the light laps the fibers are not so liable to choke on the cylinder teeth, thus retarding the cleaning action of the screens and flats. A slow doffer speed allows the doffer to take the fibers off of the cylinder more evenly

than a fast speed would, because giving more opportunity for dirt and trash to fall out of the cotton between the cylinder and the doffer.

The following are good average speeds for running different parts of cards: Doffer, 90 feet per minute surface velocity; cylinder, 2,100 feet per minute surface velocity; licker-in, 1,000 feet per minute surface velocity.

Fifth. What is the best draft and what difference does the draft make?

Draft makes very little difference in the running of a card; except as in relation to the question discussed in numbers four and six. I would consider a draft from 80 to 85 to be about right.

Seventh. "Which would be the best for the manufacture of 20's yarn, the 40-inch or the 45-inch card?"

The 40-inch card would be the better, because the 45-inch card requires more floor space, more power to operate and is heavier in all parts, necessarily putting more strain on all bearings and gears and causing more vibration if the floor is not perfectly solid and the card well fastened. Then, too, with the 45-inch card, it is a question if it would not be almost impossible to get a good setting on the flats, as in all flats there is a slight amount of sag and on the wider cards this would be increased to a certain extent. The same argument would apply to the mote knives and screens. The wider card would also require excessive draft either on the card or in the subsequent processes.

These answers are merely my own opinion upon the questions, and are conclusions at which I have arrived after some experience in carding combined with a technical study of the subject. Perhaps good carders will take exception to many of the statements contained herein; if so, I should be glad to hear from them through the discussion pages of COTTON, as I am always open to conviction, providing the other man's argument is convincing.

And now, Mr. Editor, I should like to ask a question about carding myself, and have some good practical carder to give his opinion through the columns of this department.

What different settings, if any, should be used on the several parts of the card, for long Sea Island cotton and short Upland cotton? Student (North Carolina).

EDITOR COTTON:

(1) It depends on the number of doublings in the mill. If the doublings are under 20,000, the light work after stripping will cause a slight variation. If the doublings are as found in the average mill, the light work is entirely lost in the doublings.

(2) Dry air will attract the stock and cause the web to follow the doffer, while damp air will cause it to sag—slightly in both cases.

(3) It depends on the stock used. For the average one-inch American cotton, 4½ per cent.

(4) It again depends upon the stock. For long stock slow carding is best, as a long draft helps to straighten and draw the long fibers, while in case of short stock, a light sheet of lap, short draft and high doffer speed is best.

(5) It does not require an expert to reason out that Sea Island cotton can stand a draft of over 100 inches more than ⅞-inch cotton.

(6) Slow carding.

(7) I have no use for a card over 40 inches wide. One can run a light sliver more easily and better with a 40-inch card.

We are steadily but surely all drifting to a light card sliver. One can obtain a better setting with a 40-inch card, and have less trouble from the web sagging. Sagging, of course, depends a great deal on the location in which the card is run, and also on the experience of the carder. However, a doffer comb, as a rule, must be set a little higher on a 45-inch card to eliminate the sagging of the web. The settings are more easily disturbed when a lump of cotton is allowed to pass through the card.

An Onlooker (New York).

EDITOR COTTON:

The six questions asked through your columns by "Young Student" (Georgia), are a never-ending source of interest to mill men everywhere; therefore, I will endeavor to answer them from actual experience. In dealing with question No. 1, I take it that "Young Student" does not care what kind of cotton is being used, but just as he stated, the effect stripping has on the yarn.

It stands to reason that if the wire on the cylinder and doffer gets filled up with impurities and are not stripped out, they will, as it were, overflow and run in the can with the good sliver, and it will produce a rough, oozy and dirty-looking yarn, besides giving more trouble in running it through the various processes, causing ends to break, clogging up the flutes of the steel rolls and throwing off more flyings on the frames, more or less of which will get into the work, as it will be noticed that there are a lot of short and unripe fibers taken out of the wires on both cylinder and doffer, by the stripping roller.

I have worked in mills where stripping out took place four times in a ten-hour day (using Sea Island cotton, which was afterwards double combed), and also in mills where they stripped only twice per day (using strict middling), but I prefer to watch the work, and that is the only way to determine how many times per day it is advisable to strip out. Therefore, the answer to the first question is, in my opinion, that stripping helps to make a stronger, smoother and cleaner yarn.

Dry air in a card room causes the web in front of the doffer to curl up and break, and if not detected, the cotton will run around the doffer, crushing and facing up the wire, besides making lots of unnecessary work and waste. The best way to overcome this trouble, if you cannot get humidifiers, is to inject steam over the cards, but not too much, as that would have a tendency to ruin the wire and would also get into the work, thereby making it difficult to keep the right size, owing to the roving and yarn drying out later. Too much damp air also makes the cotton lap around the leather rollers in the draw frames and fly frames.

The average loss per cent during carding for middling should be about 3 per cent for strippings, .60 per cent for flying, .50 per cent for motes, .17 per cent for sand, which totals 4.27 per cent without cylinder strips or invisible loss.

Now, in the fourth question, I think "Young Student" has made a mistake in the wording of it, as apart from carding the best of cotton, such as Sea Island and Egyptian, where the speed of the cylinder should be reduced, there is no such thing as slow and quick carding. As a matter of fact, the speed of the cylinder is about 165 revolutions per minute, and it is not advisable to run it much faster on account of the centrifugal action which occurs. If it is speeded much more it would make close settings im-

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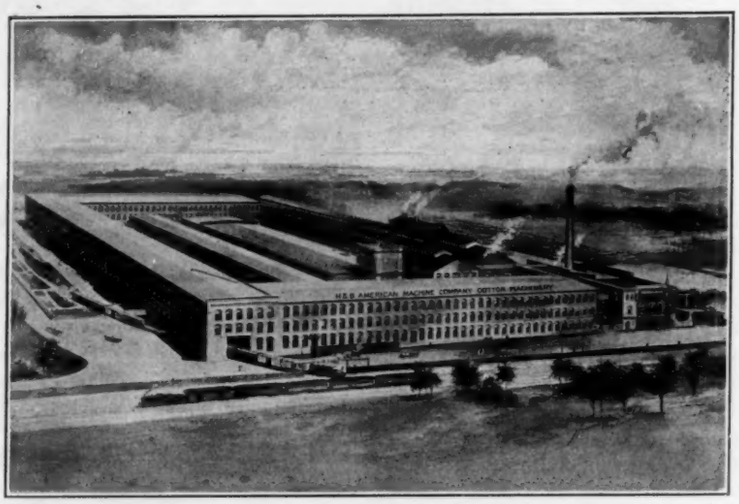

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possible, as there would be a tendency for the cylinder to run more out of truth. What he means is lighter or heavier carding, as the severity of treatment after the fibers are presented to the action of the licker-in until taken off the cylinder by the doffer is about the same in all cases. It is not good practice to overload the cylinder. I think a 13-ounce lap making a 52-grain sliver is one that gives good results. It also depends on the goods being made and the amount of production required, as to the speed to run the doffer. The difference in the strength of the yarn would be noticeable, and certainly would not be traced to a difference in one revolution of the doffer, or an ounce or two in the lap.

The draft of cards, in some measure, depends on the cotton used. A long draft of, say, 130, is often used for Sea Island and Egyptian, but for American a draft of from 90 to 110 is all right. If the draft is excessive, on short-stapled cotton, it will not "hang together" in the web as it should and will often break on that account, which shows it makes a weak sliver.

The last question is one easily answered, as it is well known that if you run the doffer slower, it will certainly make a cleaner sliver. The licker-in knives would be able to take care of it better in regard to taking out impurities. So much could be written on these questions that I hope to hear from "H. E. W." and "X. Y. Z. A.," as well as any others, on this subject. Lance (Michigan).

NOTICE.

Will Oscar E. Johnson, of 112 Francis street, kindly advise the editorial department of the city and state where he resides?

A CLOTH ROOM EXPERIENCE.

EDITOR COTTON:

I am reading with interest the article on the cloth room now running in COTTON and I wish to relate a little personal experience that will illustrate the effect of team work and fair wages in the cloth room. I was given a position as overseer of the cloth room at a mill where there had been endless trouble along certain lines. I had little difficulty in locating this trouble which was almost exclusively with the cloth room and due to an inexperienced overseer and inefficient and indifferent help. Soon after arriving at this place I was called into the treasurer's office and informed by him of a conversation that he had overheard between the buyer for the largest and about the only user of the particular class of goods in question. The buyer of these goods was in the market for a large order, but specifically stated to the selling agent for our mill that he could not use the goods from Blank mill, here calling the name of our plant. The buyer, not knowing our treasurer was present, went somewhat into detail giving some of the reasons why he could not use our goods. Here the presence of our treasurer helped us, for when the buyer was gone, after having placed an order, the treasurer persuaded the selling house to give him a small portion of this order, agreeing to assume all risks and to ship goods without any mark indicating from whence they came.

This plan, although possibly a bit deceptive, worked fine. The buyer complimented our goods and rushed a repeat order, not knowing he was buying from us. When informed of the trick played upon him he stuck to the bargain and let the order stand, and when I left this mill

several years later, these users were buying nearly or quite the entire production of several hundred looms.

In your opinion was the raise of 50 cents per day to this overseer thrown away, and was the raise of wages granted the help unnecessary? I say it was money well spent and that it should be done more frequently. Team work in many room counts and a reward for such work in real money engenders much good feeling and more perfect productive results. A Cloth Room Man. (Georgia.)

A RING SPINNING POINTER.

EDITOR COTTON:

For a ring spinning spindle in operation, it is very essential that the spindle, which passes through the ring, should be equally distant from every point on the inside of the ring. Therefore, if the lifter rod bushings are worn, this adjustment is not attained. If the reader has charge of ring spinning, let him pry the ring rail and he will, perhaps, be amazed at the play he will find. This is very important. For instance, if the pulley on the end of the frame is worn or out of balance, a great amount of vibration is created which is conveyed to the ring rails.

I need not point out here that any vibration of the ring rails will cause a large amount of ends to break continually. In fact, I remember well when I was up against such a proposition, and felt so glad when I discovered the trouble that I have pointed it out to every mill man I have come in contact with ever since. I think if the overseers of ring spinning will examine carefully the parts I suggest, they will find it well worth while.

Wash (New York).

RUNNING OVER AND UNDER ON THE FLY FRAME.

EDITOR COTTON:

I see by the November issue of COTTON that "W. B. W." waxes somewhat sarcastic and makes references to filing the weather vane on the tower, concluding with the statement that he expects to see some hammers out. I would not be at all surprised if someone got an axe.

Now "W. B. W.," if the carriage changes at a certain point and no other, how is it that when a speeder runs under and over, that rubbing the end of the latches and rocker with emery cloth will remedy the trouble? This can be proven by the readers, and is a most valuable point.

"W. B. W." also speaks about spacing the slide of the twin gears, and on this point I wish to ask the following question:

When a rocker is operated by springs, what causes the carriage to change at ¾ of the traverse or around ¾ of the traverse? What I mean is, that on one traverse only during the set or every two or three layers, the traverse will change as stated. This causes the ends to run slack, and is a most puzzling problem and one that will be appreciated by those who have been up against it.

Worn pins in the bars of the flyer will cause it to run over every now and then. Have the flyer pin fit the slot of the spindle properly. That is one remedy. Are there others? Explain all the causes and remedies known. It is valuable "dope." Wash. (New York.)

Some men are born great, some achieve greatness, and some manage to put up a successful bluff

NEW MACHINERY AND TRADE NOTES.

A KINDERGARTEN DE LUXE.

A kindergarten de luxe has been provided for the children guests at the Vanderbilt Hotel, 34th Street, East, at Park Avenue, New York, and has been thrown open for inspection and use. Manager Walton H. Marshall explained that his aim in providing the institution was to help make hotel life in New York as attractive as possible for the children whose parents prefer it to housekeeping. The idea is that of Mrs. Edgar Lack Speer, and the artist who has carried out the proposition is Leo Helmholtz Junker.

On the walls are painted scenes from Mother Goose Tales, and in an alcove is The House That Jack Built, which is just like a real house, and you can go in it and sit, if you are small enough, and look through the windows, and play you are the lady of the house and receive callers. The furniture of the playroom is all diminutive, the chairs being small enough for a child who is beginning to walk to occupy. The ordinary chairs and the arm chairs, together with a long, low table and the settees, are all in white with blue decorations, and the carpet on the floor is of blue. One row of shelves contains books with all sorts of fairy tales in them, and another is filled with dishes of the size that little folk like. Besides, there are all sorts of toys. In the pictures on the walls are none depicting goblins, giants and wicked fairies. The wooly lamb is barred from the room, as is everything else insanitary.

ATHLETICS AS AN AID TO EFFICIENCY.

THE AMERICAN PULLEY CO., is to be congratulated on the form displayed by its employees on their first annual field day held not long ago on the company's big athletic grounds.

The record made by these men compared more than favorably with those of colelge athletes and other amateurs. But that is not all. The company has a greater claim to congratulation in its progressiveness and far-sightedness in providing such ample facilities for, and promoting interest in athletics among its employees. Other large plants would do well to take to heart the motto which the officers of the American Pulley Company have, perhaps unconsciously, adopted, "All work and no play make Jack a dull boy." One thing is certain, "American" Steel Split Pulleys have not suffered in quality, nor has their number per day diminished since field sports were introduced at the company's Philadelphia plant. Every day during the noon hour the large athletic field is used by the employed.

THE BERLIN ANILINE WORKS, 213 Water street, New York City, are sending to the trade a color card of their new substansive cotton dyes called "Columbia Catechine 3 B, R, G, and O. These dyes are particularly good for the production of mode shades on cotton in all stages of manufacture. Methods of using these dyes are given, as well as all information. Color cards may be secured on application to the company.

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AN investigation into net roofing costs will promptly disclose the superiority of Barrett Specification Roofs. Their first cost is lower than that of any other permanent roof, and, as they require no painting or other care for upwards of twenty years, their maintenance cost is nil.

The Bush Terminal Company, with a total roof area of more than 70 acres (3,100,000 square feet) on their 181 buildings in Brooklyn, N. Y., illustrated below, studied the subject of roofing costs and adopted this type of roofs. The Vict-President of the Bush Terminal Company writes:

> We use this kind of roofing because our experience has shown it to be the best and cheapest. Our analysis of first cost of application and cost of maintenance entitles us to speak with some measure of authority.

The roofing contractor states that the expense for maintenance of this entire roof area has been less than $10 and estimates that if metal or ready-made roofings had been used it would have been impossible to keep the buildings free from leaks, and that the painting bill alone up to date would probably have amounted to at least $50,000.

It is on such evidence as this that we base the statement that the maintenance cost of Barrett Specification Roofs is **nothing per year**—and the $10 exception "proves the rule."

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TRADE B MARK

THE EMERSON LABORATORY.

One of the growing concerns which has recently established itself in the excellent new quarters at Springfield, Mass., is the Emerson laboratory now situated in the Chapin building, corner of Chestnut and Winter streets.

The new quarters occupy a large portion of the second floor of the building, and the various departments are equipped in the most thorough and modern style. Besides a large general laboratory, there is a special room for making tests of water, a coal-testing room, a bacteriological department, iron and steel testing department, a department devoted to tests of cement and others for the examination and testing of all materials and dyes used in textile and paper mills. Apart from these specific lines of work the laboratory is equipped in its general laboratory for making tests and analyses of various other kinds. Besides the rooms mentioned, there is a roomy office used by Dr. H. C. Emerson, head of the concern, a general office where the business is transacted, and a library in which are kept the necessary volumes on chemistry and periodicals and current publications dealing with pertinent matters.

MAIN LABORATORY, SHOWING GLASS ROOM IN CENTER FOR THE BALANCES.

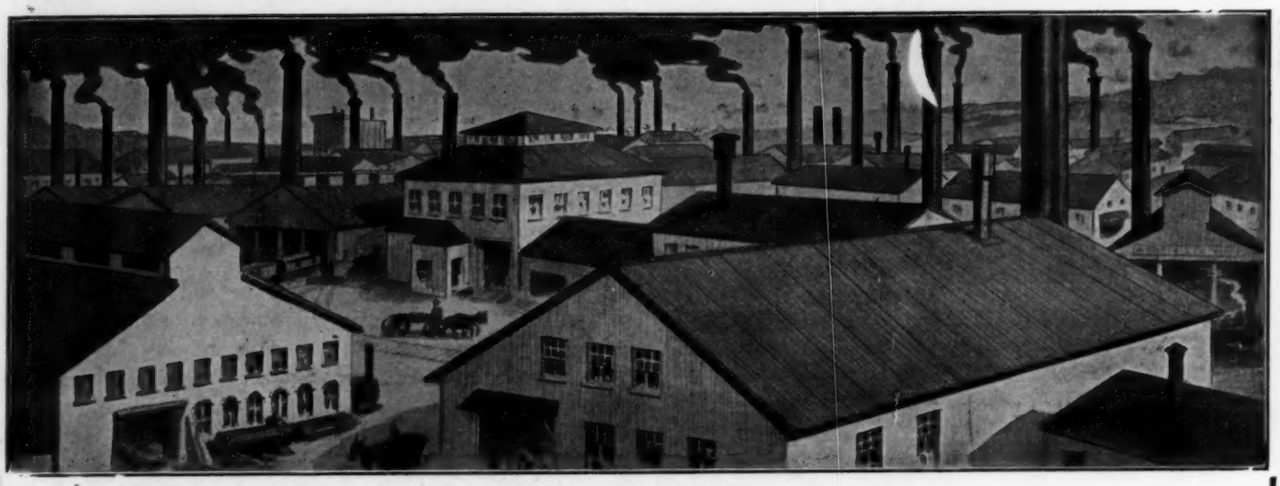
Back of the general office is the bacteriological laboratory. This is supplied with all necessary materials for effecting bacteriological tests of milk and water, a line of work in which the Emerson laboratory is very active. There are two incubators, one of the 20-degree centigrade pattern, and the other 37-degree centigrade, used for the incubation of bacteria. Bacteriological counts and tests of all kinds can be made in this room.

In the main laboratory are two large tables supplied with apparatus of many different kinds for use in general work. Here is a battery of stills used in nitrogen distillations, and a number of electric stoves used for heating samples to be tested by the alcohol-ether extraction processes. These latter are used especially in testing paper for rosin, food stuffs for fat, and the like. Just off the general room is the water-testing room, where chemical analyses of water are made. There are more stills in this department and other needed apparatus, including the most modern refrigerating packing cases for use in the shipment of water samples. Next the water-testing room is that in which specimens of coal are tested for their heat value, or British thermal units. The room is supplied with a bomb calorimeter, the most up-to-date apparatus for that work. In this room is also a polariscope for sugar determinations.

The department where iron and steel are tested contains a group of furnaces and hot plates, and is equipped with the most modern style of hoods for carrying away the vapors. There is also apparatus for determining the different elements in the metal composition, carbon, nickel, manganese, and the like. Next this is the room where tests are made of textile and paper mill materials, fully equipped and one of the busiest divisions of the entire laboratory. An unusual group of fixtures is a battery composed of a water boiler, pulp-drying oven, a sterilizer, a Babcock milk tester and a water still, all connected and available for making a number of different tests.

The balance room is located in the center of the laboratory in order to be conveniently reached from every point. It is practically a glass room with a large skylight above, so that there is efficient lighting and ventilation at all times. The balances are set on steel uprights bolted to I-beams, which are carried on the brick foundation walls, and so arranged that the sensitive balances are entirely free from the effects of any jar. The cement testing room is equipped with machinery for testing samples of sand and cement and with a Fairbanks tensile strength tester.

Scarcely anything has been neglected in the effort to



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make the laboratory as efficient and systematic as possible. All plumbing is visible, and each pipe is painted a different color, that there may be no mistake in turning on the desired article, be it gas, water, steam or compressed air. There are a number of supply rooms and a large supply of all the constantly used materials is kept always on hand. The Emerson laboratory was established in 1899, and the present members of the laboratory staff and the departments over which they have charge are as follows: H. C. Emerson, director, bacteriological and medical tests; F. W. Farrell, chief chemist, paper, food and glue; G. L. Clark, fuel, oils and metals; W. H. Wooffindale, textile; C. R. Cressy, cement; E. A. Treadwell, assistant.

ONE WAY TO ECONOMIZE.

With the reduction in tariff on cotton goods it will be more important than ever before to reduce manufacturing costs to the lowest possible point. The DRAPER COMPANY, Hopedale, Mass., in a recent issue of *Cotton Chats*, call especial attention to the Northrop automatic loom, which makes possible an average saving of more than one-half the labor cost of weaving, while increasing the weavers' wages, as being at this time a necessity.

They give the following reports from Northrop loom mills, which are interesting:

From a mill with about 700 looms: 38 ½-inch goods, print cloth weight. Average 26 looms per weaver.

A mill with about 1,800 looms: Wide print cloths. 20 to 22 looms per weaver.

From a mill with about 2,000 looms: Sheetings, etc. Average 20 looms per weaver. One weave room with 32 looms per weaver.

A mill with about 500 looms: Convertible goods. 20 to 24 looms per weaver.

Six hundred looms: Wide prints, etc. Northrop looms, 24 to 26 per weaver. Common looms, 8 to 10 per weaver.

One thousand looms: Export sheetings, etc. 20 to 28 looms per weaver.

About 800 looms: Print cloths and fancies. 20 to 24 looms per weaver.

From a mill with 950 looms: Sheetings, etc. 18 to 26 looms per weaver. One weaver 28 looms.

A mill with about 1,700 looms: Print cloths. 20 to 32 looms per weaver.

From a mill with about 300 looms: Sheetings. 20 to 24 looms per weaver.

A mill with about 1,000 looms: Sheetings. 18 to 28 looms per weaver. Two weavers 36 looms each.

From a mill with about 600 looms: Wide print cloths. 20 to 28 looms per weaver.

A mill with about 2,800 looms: Sheetings, drills, etc. In several cases weavers are running 24 to 34 looms each.

From a mill with about 1,300 looms: Print cloths. 16 to 36 looms per weaver. One weaver, 40 looms.

THE G. M. PARKS CO., of Fitchburg, Mass., have recently made some changes in its representatives in different sections.

F. C. Bryant, who has represented the G. M. Parks Company, in Rhode Island, Eastern Massachusetts and Maine for the past three years, has recently tendered his resignation and accepted a very attractive position with the Parks & Woolson Machine Company, of Springfield, Vt.

To take Mr. Bryant's place in the eastern territory for the G. M. Parks Company, B. S. Cottrell, who has been the Southern representative for the Parks Company for the past four years, has been moved from his many friends in the southern territory and returned to his old stamping grounds in New England. Mr. Cottrell is a graduate of Cornell University, and also a graduate of the Amoskeag Mills. He was at one time assistant superintendent of the Tremont & Suffolk Mills, at Lowell, Mass.

Mr. Cottrell's place in the South will be taken by James S. Cothran, who is well known to all mill men, having been connected with the textile industry for about 15 years, and who has been Southern representative for the American Moistening Company for about seven years.

ATTACHMENT VACATED.

The American Surety Company was made defendant in a suit filed recently in the supreme court for $5,652, by Alvin V. Hupfer, as assignee of a claim of the Farbenfabriken Vormals Friedrich Bayer & Company, Elberfeld, large dye manufacturers, arising out of a suit for $1,200,000, in which the dye works was named as defendant, and John & James Dobson, manufacturers of cloths, carpets, woolens, etc., were the plaintiffs.

Through his attorney, Anthony Gref, the plaintiff alleges that on June 12, 1913, James Dobson, as surviving partner of the firm of John & James Dobson, brought an action against the German dye works for $1,200,000 and applied to one of the judges of the United States District Court for a warrant of attachment. In conformity with the law, the complaint states, the plaintiff in that action and the American Surety Company, filed a joint bond for $25,000 that they would be responsible for any sum up to that figure the dye works might suffer through the levying of the attachment. On July 18, 1913, the warrant of attachment was vacated, it is stated, but by reason of its issuance the dye works had been damaged to the extent of $5,652. This amount has been demanded of James Dobson, it is stated, but payment has been refused, so suit against the surety company was begun.

The action in which John & James Dobson and other plaintiffs sued the dye works alleged it was a combination in restraint of trade and charged the defendant maintained a trust and monopoly in Europe which they had extended to this country by organizing companies and agencies over which they exercised absolute control. The operators of the "trust," it was alleged, created an unjust, unlawful and damaging monopoly in the whole textile industry and that prices of all dyestuffs necessary to the textile business had been boosted in consequence.

THE FLEXIBLE STEEL LACING CO., formerly of 542 West Jackson Boulevard, Chicago, announce that owing to the expansion of sales of their Alligator steel belt lacing, they moved their plant on November 1 to 522 South Clinton street, into a modern fireproof building, where they have over doubled their former floor space, and have ample facilities for taking care of the steadily increasing demand they are receiving for Alligator lacing. All inquiries for this lacing should now be addressed to the company at their new address, 522 South Clinton street, Chicago, Ill.

REAL VALUE

For twenty-five years there has not been a press built the equal in efficiency, economy or durability of the

LOGEMANN BALING PRESS

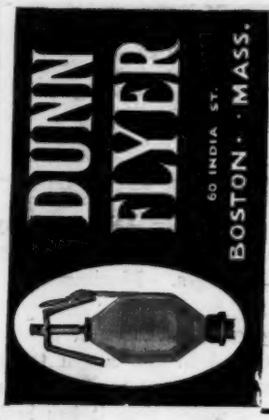
With over fifty styles to select from, and with our guarantee of the most modern, powerful and rapid press, with best workmanship and material throughout, the best BUY is undoubtedly the Logemann Machine.

Over 50 Styles—Hand—Belt—Electric—Hydraulic.

LOGEMANN BROTHERS CO.

280 OREGON ST., MILWAUKEE, WIS.

Southern Representative, J. H. MAYES, Charlotte, N. C.



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NO CHANGING SLOT.
TWIST RETAINED.
A " DOG DAY" FLYER

MORE AND BETTER ROVING

LESS DOFFING, HANDLING, SETTING IN, PIECINGS AND WASTE.

Costs No More
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Certified Public Accountants
Industrial Engineers

40 Central Street **Boston**

Specialists in Textile Cost Accounting

GLENLYON DYE WORKS

(Yarn Dept.)

CENTRAL FALLS, R. I.

FRANK A. SAYLES, Lessee

Bleachers and Dyers

OF

Cotton Yarns in Ball-warps and Skeins, Silk and Viscose Silk

SPECIALTIES: COLORS FAST TO BLEACHING, Mercerizing, Laundering, Cross Dyeing and Light. Dyed Novelty Effects in Fast Colors. High Grade Bleaching of Cotton Warps and Skeins. Silk Dyed Fast to Boiling Off and Bleaching.

Insist on Having

"GLENLYON DYED YARNS"

Safest and Most Reliable in the Market.

Write for Shade Card, Information and Guarantee.

The "1912" Cloth Cutting, Folding and Winding Machine

This machine will cut down operating expenses. It does in one operation the work which is now being done in two. Is cuts the cloth, folds the edges and rolls them up in one operation, and at all times gets one more strip out of a bolt of cloth than is possible with the old method of cutting. At the same time it measures the bolt of cloth to show the manufacturer whether or not he is getting the number of yards he is paying for. With the high price of cotton to-day every knit goods manufacturer ought to look into this to see if he is getting the maximum efficiency at the least expense. You will find when you come to figure it up in the course of a year that the labor it saves is a b g item.

Also have other labor-saving devices, and upon application you can get prices and full information on same.

J. A. FIRSCHING, 50 John St., Utica, N.Y., U.S.A.

WORTH TRYING

Alumina Soapalite

SOMETHING NEW FOR WASHING

THOROUGH AND HARMLESS

GET FREE PARTICULARS

THE ELECTRIC SMELTING & ALUMINUM CO.

Patentees and Sole Mf'rs. **LOCKPORT, N. Y.**

BOOK REVIEWS

All Books Reviewed Under This Heading May Be Procured From COTTON at the Published Price.

COTTON FACTS. Edited by Carl Geller. Published by the Shepperson Publishing Company, Cotton Exchange Building, New York City. 234 pages. Flexible cover. Price $1.00.

This is the 38th annual issue of what has now become the standard publication of its kind in the cotton trade. Col. Shepperson, who died about three years ago, first published this book in 1876, since which time it has built itself a place as a comprehensive and yet concise encyclopædia of cotton trade statistics. The present issue, in addition to the usual statistics of acreage, consumption, crops, exports, prices, receipts, stocks, mill takings, etc., also contains the world's production of cotton; cotton growing in the British empire; Texas rainfall and annual metrological data; conversion table of Fahrenheit into Celsius and Reaumur; causes and extent of damage to cotton crops; monthly and yearly exports of cotton cloth and yarn from Great Britain; weekly sales of print cloths at Fall River; special characteristics of important varieties of cotton; cotton waste in the United States; cotton seed products; weekly stocks at 28 interior towns for eight years; weekly intosight of American cotton; weekly takings of American cotton; visible supply of American and all kinds, New York exchange figures; takings by Southern mills; spindleage of the Southern states, and much other interesting new data.

BENNETT'S HANDBOOK OF TEXTILE CORPORATIONS, FOR 1913. 751 pages. Price $3.00. Published by Frank P. Bennett & Co., Inc., Boston, Mass.

This handbook is intended to be of service and value to textile manufacturers, bankers, brokers, and also to the investor in mill shares. Where it has been possible to secure the information, textile corporations are listed, giving their financial standing, their equipment, their product, the names of their officers, the capital stock issued, and when it is possible an annual statement of the mill is also published. With the purchase of this book goes the right to ask questions pertaining to the financial conditions of textile companies. Also the right to ask questions in regard to the textile industry, which will be answered in a certain manner, as described in the preface or foreword of this book.

Engineers who keep a file of books for reference will be interested to know that the Joseph Dixon Crucible Company, Jersey City, N. J., still have a limited number of booklets dealing with such subjects as "Steam Traps," "Unions for Steam Pipes," "Feeding Graphite for Lubricating Purposes," etc., which will be sent free as long as the supply lasts, to anyone who cares for them. These treatises were prepared by the well-known engineer, Mr. W. H. Wakeman, who has written many articles on practical engineering problems. Numerous illustrations are used to make each subject easily understood. These booklets were printed some time ago, but are just as desirable as ever.

DOCKHAM'S REPORT AND DIRECTORY OF GLOVE AND MITTEN MANUFACTURERS FOR 1913. 24 pages. Price $1.00. Published by the Dockham Publishing Co., 6 Beacon street, Boston, Mass.

This authentic report and directory for the United States and Canada gives the kinds of gloves and mittens manufactured; the class of material used, whether light or heavy; the number of sewing machines in each plant; the kind of power used; the New York City offices, if such are maintained; whether or not the firms sell to jobbers or retailers, etc. The firms are arranged alphabetically by states, cities and firms, and the street and number are given. This book was especially compiled for glove and mitten buyers and manufacturers, also for manufacturers and dealers in machinery and supplies.

HOW TO BUY DYESTUFFS. A brochure by the Casella Color Company, 182 Front street, New York. 35 pages. Numerous illustrations. Distributed by the publishers.

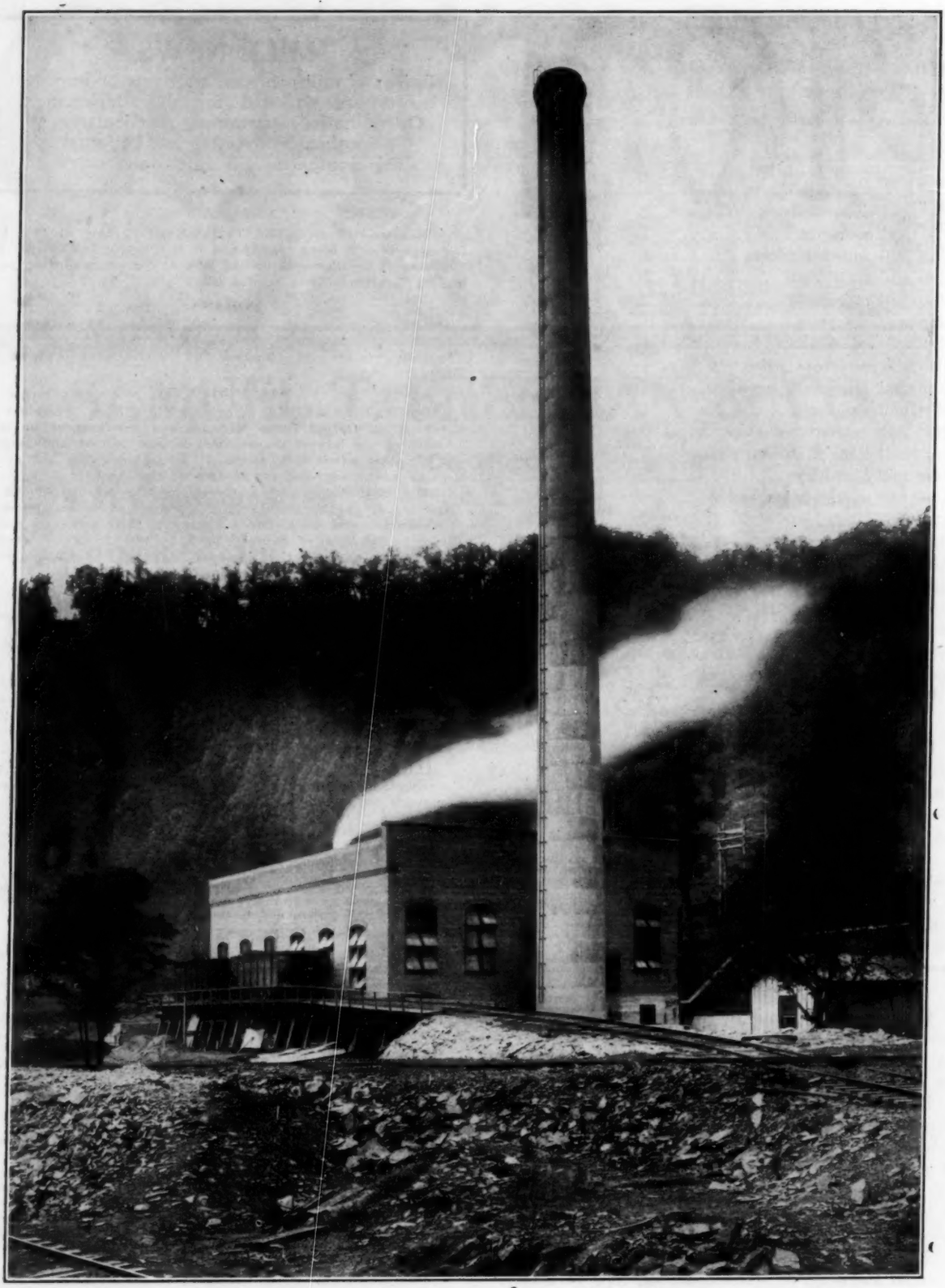
The contents of this brochure consists mainly of illustrations from 50 different books published by this company and which, when brought together form a "Five-foot book shelf," on which the buyer or the dyer can command practically all that he needs in the way of information regarding the application of modern dyestuffs.

The proper selection of dyes involves no mystery. If the dyer knows the requirements imposed upon the fabric which it is his duty to produce, the full technical information which the Casella Color Company distributes, places him in a position to make a selection suitable to his purpose. No dyer can memorize the full technical information that has been prepared and published regarding every dyestuff on the market; no dyer, or color mixer, can recall definitely whether certain dyes will mix compatible with each other in the dye bath, unless he has had experience with them, but by the aid of the literature referred to, and which has been published and distributed, he is in a position to quickly determine what is best suited for his work.

The Year Book for Colorists and Dyers, by Herman A. Metz, president of the Farbwerke-Hœchst Co. 419 pages. Several illustrations. Distributed by the author.

This is volume 15 of the year book which is issued annually by its author. It is recognized throughout the dyeing trade as a valuable reference book. It contains a review of the year's developments in dyeing and allied trades; reference tables; a chapter on the Eighth International Congress of Applied Chemistry; patents for the year 1912; Notes on processes, new colors, etc.; A chapter devoted to the educational work in England along these lines; A list of dye stuff makers and methods; miscellaneous notes, and a thoroughly compiled index. It will be well received by the trade and find a place on the book case shelf or the dyer's desk that it well merits.

The HESS-BRIGHT MFG. CO., are sending out a neat booklet entitled, "Ball Bearings for Axle Generators." This little booklet is a brief discussion concerning ball bearings and their application to generators with particular reference to the Hess-Bright bearings. The problem of successful train lighting by electricity is chiefly a problem of maintenance, and in this booklet they show how that maintenance cost may be reduced to its lowest terms by the use of Hess-Bright bearings. The booklet is thoroughly illustrated and neatly gotten up.



This photograph shows a Clinchfield power house, costing a quarter of a million dollars and located at Hurricane, Va. It supplies current for lighting and operating the Laurel and Dante Mines. It was designed, as a model plant, by the engineers of the Clinchfield Fuel Company. The stack, which is built of concrete, rises to a height of 225 feet above the grates and is of large internal diameter, thus affording a draft of such strength as to enable the plant to use coal of the widest variation in grade. The usual fuel runs about 25 per cent ash and consists of mine refuse and dust.

Much of the time there is not sufficient fine coal, and often use is made of the lowest grades of material, such as coal dust mixed with dirt, shoveled up from the mountain sides below the tipples. Some of this dust has been exposed for years, but the plant is so well equipped that the boilers produce more than their rated amount of steam.

CLEMSON MEN OF FIBER.

Clemson College of South Carolina has sent out a circular giving a list of their students who are now connected with the textile industry, as follows:

	Textile Course	Other than Tex. Course
Cotton mill presidents	3	0
Cotton mill vice-presidents	2	0
Cotton mill managers	5	1
Cotton mill superintendents	9	1
Cotton mill ass't. supts.	2	0
Cotton mill overseers	12	0
Cotton mill designers	2	0
Cot'n. mill section men and operatives	11	2
Cot'n. mill sect.-treas. office, etc.	4	4
Cotton mill purchasing agents	2	0
Cotton mill architects	4	0
Cotton mill master mechanics	0	1
Cotton mill mach'y. and supplies	7	2
Cotton mill bleachery	2	0
Cotton mill and state inspectors	4	0
Cotton mill, instructor of	1	0
Cotton oil mill managers	1	3
Cotton oil mill superintendents	0	1
Cotton oil mill vice-presidents	0	1
Cotton oil mill engineers, etc.	0	13
Cotton brokers	2	5
Cotton experts for U. S. Gov't.	1	0
Students registered for session of 1913-14	52	0

In order to properly take care of the increase in its business, the Baltimore branch of the H. W. JOHNS-MANVILLE COMPANY has been compelled to seek larger quarters. The new home of the company is a modern six-story building, with floors measuring 47 x 187 feet, located at 207-13 E. Saratoga street, which is within two blocks of the Postoffice, and right in the heart of the business section. It will include an attractive store and up-to-date offices, in addition to large warehouse accommodations. To facilitate the handling of incoming and outgoing shipments, there will be a railroad switch running into the building.

One thousand dollars for an idea seems like a large amount to pay. But in a field like advertising, the idea may mean hundreds of thousands of dollars in increasing the effectiveness of the selling expenses of manufacturers.

Recognizing this fact, ADVERTISING AND SELLING Magazine, of New York, has offered $1,000 in cash for that article which will do most to push forward the development of advertising or selling. The award is to be made at the Advertising Convention at Toronto, and the decision of merit will be made by the Awards Committee of the association.

Full information can be had from ADVERTISING AND SELLING Magazine, 95 Madison avenue, New York City.

Rosin soap for use in bleacheries and print works, rosin size in starching fabric, are two articles highly recommended by their makers, THE ARABOL MFG. CO., 100 William street, New York City. They are perfectly uniform, free from impurities and thoroughly filtered. Whoever uses them is pleased by their effectiveness and economy.

MILL NEWS

Notices of mill projects, additions or improvements are solicited for this department. Other notices pertaining particularly to the Southeastern section will be found in the Southern Mill Situation review.

DELAWARE.

WILMINGTON. The Old Taylor Hosiery Plant at 13th and Lombard Sts., is being rebuilt and it is reported locally that the Chamber of Commerce is on the lookout for someone desiring a hosiery location with a special offer.

INDIANA.

FORT WAYNE. The Anthony Hosiery Mills have recently been incorporated for $15,000 to manufacture hosiery. The incorporators are Abraham and Morris Levy, and H. M. Kahn.

MASSACHUSETTS.

NORTH BROOKFIELD. Benjamin C. Mudge, President of the bankrupt Oxford Linen Mills, says a new corporation of a number of the largest shareholders is now formed and sending out circulars advertising stock. It is reported that old stockholders have subscribed for $150,000 of the stock.

NEW BEDFORD. At a recent meeting of the Board of Directors of the Dartmouth Mfg. Corporation, it was voted to recommend to the stockholders, subject to their action, of an increase in the issue of common stock by the amount of $800,000. The present capitalization includes $1,200,000 in common stock and $600,000 of preferred stock and $800,000 in bonds.

NEW JERSEY.

CARLTON HILL. The Standard Bleaching Co., of this place have recently filed a certificate with the secretary of state for increasing the capital stock from $400,000 to $1,000,000.

DUNDEE LAKE. The Fiece Dye Works at this place will probably receive a large addition in the near future, inasmuch as it is reported that the National Silk Dyeing Co. is expecting to build an addition that will increase the capacity of this plant by 50 per cent.

NEW YORK.

ALBANY. The Parrish Knitting Co., Inc., has recently been incorporated with a capital of $20,000. William G. and Albert T. Jennings are two of those interested.

OKLAHOMA.

OKLAHOMA CITY. Once more the large cotton mill enterprize has been brought to life in Oklahoma City. At a recent meeting of the board of directors of the Cotton Mill Securities Company, which is the name by which this organization is known, various reports were read and Mr. Whaley detailed the methods of cotton mill promotion and financing.

PENNSYLVANIA.

HAMBURG. The Clover Underwear & Bleach Works have recently been granted a charter and will finish women's white knit union suits. They make a specialty of a garment to be known as the "Perfect Fitting Staon Garment." This concern will have a capital stock of $75,000. Further information can be secured from Clarence W. Yeager.

REAMSTOWN. H. L. Stork, who is connected with the New Hope Hosiery Mill, has contracted for a new factory to be built of brick.

RHODE ISLAND.

CRANSTON. The Narragansett Finishing Co., dyers and finishers of cotton piece goods, are contemplating the making of extensive alterations and additions to the group of buildings comprising the company's plants. Some of these buildings are of frame construction, while others are of brick. No definite statistics have as yet been given out.

PROVIDENCE. The Vesta Knitting Mills, at a recent meeting of the common council, asked that their taxes be somewhat abated inasmuch as the amount at present asked they claim is excessive.

PROVIDENCE. H. C. Greenlaw, of the Nottingham Mills of this city, has resigned to accept the position as superintendent of the River Point Mills at River Point, R. I. He has been succeeded by Frank W. Gurry, of Westbrook, Maine. Readers of COTTON will be particularly interested in this change, inasmuch as Mr. Gurry is a more or less frequent correspondent in COTTON'S columns.

WEST VIRGINIA.

MARTINSBURG. The Interwoven Mills have begun the construction of an additional building 140 x 50 feet, which will be used for storage and finishing. This building is to cost approximately $35,000. No machinery will be required.